THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY.

REPORT on the Botany of Juan Fernandez, the South-Eastern Moluccas, and the Admiralty Islands. By W. Botting Hemsley, A.L.S.

JUAN FERNANDEZ AND MASAFUERA.

INTRODUCTORY NOTES.

Originally the name Juan Fernandez was applied to a group of three islands, of which the two principal were called Masatierra and Masafuera, indicating their positions with regard to the mainland. Now, that of Juan Fernandez is ordinarily applied to Masatierra only. This island, which is much the larger of the two, lies in about 33° 45′ S. latitude and 80° W. longitude, or about 400 miles from the coast of Chili. The area is about twenty square miles;[1] and the greatest altitude is 3000 feet. A few miles to the south is a small island called Santa Clara or Goat Island. Masafuera is about ninety miles westward of Juan Fernandez; it is a barren rock of lava and scoria, concerning which, however, we have found no details, though some twenty species of vascular plants have been collected there by different travellers.[2] The coast is precipitous, and landing on any part perilous and difficult. Within historical times Juan Fernandez has suffered from violent earthquakes, which have desolated the settlements. Lord Anson visited it in 1741, and his description of its products is the earliest of note, yet it contains little precise information on its natural history.

[1] For further particulars on the physical composition, climate, &c., see Mr Moseley's notes below (pp. 8, *et seqq.*), and Narrative of the Cruise of H.M.S. Challenger, Chap. xix.

[2] The island is described as being covered with trees by the Rev. Mr Walter in his narrative of Commodore Anson's stay at Juan Fernandez, as quoted in Crusoniana, p. 97. See p. 25, *postea*.

Botanical History of Juan Fernandez and Masafuera.

The botanical history of these islands dates back only a little more than half a century; for the accounts of the vegetation given in the writings of earlier travellers contain little definite information, and the first descriptions of the peculiar plants have all been published since 1830. Disregarding a few odd specimens collected by various persons who have merely touched at the island, the Juan Fernandez plants in the Kew Herbarium have been collected by about ten persons. Taking these collections in their chronological order, they are—Mrs M. Graham, 1823; David Douglas, with whom was Dr Scouler, 1824; Bertero, with whom was Cuming for a short time, 1830; Gay, 1832; Germain, 1854; Reed, about 1870; and Moseley, 1875. There is also a small collection in the Kew Herbarium, communicated in 1861 by Dr Philippi, without any collector's name; whether he himself visited the island is not evident from his writings.

Lasègue[1] has little to add to the foregoing list of collectors in Juan Fernandez. He casually mentions Caldcleugh, who was attached to the British Embassy in Brazil, as having botanised in the island with Bertero. Whether he made an independent collection we have not ascertained.

A few words respecting each of the above named collectors and collections, with references to, and extracts from what has been published thereon may follow here.

Mrs M. Graham, wife of Admiral Graham, who was some time on the Pacific station, paid more attention to ferns than flowering plants, though among the latter was a specimen of a *Wahlenbergia* (*Wahlenbergia grahamæ*, Hemsl.), which was rediscovered by Mr Moseley, and is published in this Report for the first time. This lady, who was no mean artist herself, as a picture painted by her of the Bay of Rio Janeiro, now in the possession of Sir Joseph Hooker, testifies, afterwards married Sir Augustus Callcott, the well-known painter, and *Escallonia callcottiæ* was named after her. In her Journal of a Residence in Chili, she gives a charming description of the Island of Juan Fernandez:—

"It is," she says, "the most picturesque place I ever saw, being composed of high perpendicular rocks, wooded nearly to the top, with beautiful valleys; and the ruins of the little town in the largest of these heighten the effect. . . . The valleys are exceedingly fertile, and watered by copious streams, which occasionally form small marshes, where the Panke [*Gunnera*] grows very luxuriantly, as well as watercresses and other aquatic plants. The little valley where the town is, or rather was, is full of fruit trees, and flowers and sweet herbs now grown wild; and near the shore it is covered with radishes and seaside oats. After dinner I walked to the valley called Lord Anson's Park, and on the way found numbers of European shrubs and herbs, and in the half-ruined hedges which denote the boundaries of former fields, we found apple, pear, and quince trees, and cherries almost ripe. The ascent is steep and rapid from the beach, even in the valleys, and the long grass was dry and slippery,

[1] Musée Botanique de Monsieur Benjamin Delessert, p. 259, &c. See also Hooker's Botanical Miscellany, iii. p. 303.

so that it rendered the walk rather fatiguing, and we were glad to sit down under a large quince-tree, on a carpet of balm bordered with roses, now neglected, and rest, and feast our eyes with the lovely view before us. Lord Anson has not exaggerated the beauty of the place, or the delights of the climate. We were rather early for its fruits; but even at this time we have gathered delicious figs, and cherries, and pears, that a few more days' sun would have perfected."

Mr David Douglas, whose numerous discoveries in Western North America are known to botanists and horticulturists alike, and who met with an untimely and horrible death[1] in the Sandwich Islands some ten years later, landed on Juan Fernandez on his first outward voyage in 1824. He was accompanied by Dr Scouler,[2] who was more specially devoted to zoological pursuits, though he made a small collection of dried plants. Their stay was very short, but Douglas[3] estimated that he collected seventy "distinct and highly interesting plants." Like Mrs Graham, he observed the colonised fruit trees, and he also mentions the Chilian strawberry, which was, and is still, very abundant; but his brief account of the vegetation contains nothing of special interest.[4] Many of his plants, as well as Bertero's, were described and published by the late Sir William Jackson Hooker and Dr G. A. Walker Arnott.[5]

The next in order is Bertero, who almost exhausted the botany of the island, and who, although he did not live to publish his plants, thoroughly studied and carefully labelled them—not one set alone but several, so that there is little difficulty in identifying them from the descriptions where the notes on Bertero's labels have been added. Dr Charles Joseph Bertero was born at Turin,[6] and was a member of the Academy of that town. In 1827 he left Europe intent upon the botanical exploration of Chili, towards which little had previously been done; and by the end of 1829 he had collected a herbarium of some 15,000 well preserved specimens. As the country was then being desolated by a civil war, he determined to leave the mainland and botanise Juan Fernandez and some other islands of the Pacific. He successfully accomplished that portion of his task relating to Juan Fernandez, where he collected about 2000 specimens, comprising, inclusive of cellular cryptogams, 300 species. This was done during the first half of the year 1830, and on his return to Valparaiso the plants were soon despatched to Europe, one set to Sir William Hooker, one to Mr Delessert, one to Turin, and others to various botanical establishments. Where the first or most complete set is we do not know, but the one acquired by Sir William Hooker, now in the general Herbarium at Kew, is nearly if not quite complete,

[1] He was found in a pit made to entrap cattle, gored to death by a bullock.

[2] Afterwards Lecturer on Natural History, and Keeper of the Royal Dublin Society's Museum.

[3] Hooker's Companion to the Botanical Magazine, ii. p. 86.

[4] Hooker's Companion to the Botanical Magazine, ii. pp. 84–86.

[5] Contributions towards a Flora of South America and the Islands of the Pacific: Hooker's Botanical Miscellany, iii. 1833, pp. 129–211, 302–367; Hooker's Journal of Botany, i. 1834, pp. 276–296, iii. pp. 19–47, 310–348; Hooker's Companion to the Botanical Magazine, i. 1835, pp. 29–38, 102–111, 234–244, ii. pp. 41–52, 250–254.

[6] Lasègue, Musée Botanique, p. 260.

judging from what has been published by Continental botanists. He also wrote[1] a sketch of the flora, the substance of which is reproduced below.

After arranging and sending off his plants to Europe, Bertero embraced the opportunity offered by a vessel sailing for Tahiti, to go to investigate the vegetation of that island, and, after making valuable collections, he took a passage to return to Valparaiso in a new Tahitian schooner, which was never heard of again after leaving port.[2] A sad fate, indeed, but far preferable to the shocking end of poor Douglas, who was the only botanist that anticipated Bertero in the discovery of the arboreous genera of Juan Fernandez Compositæ. Yet Bertero was the first to make them known to the world; and two of the genera and most of the species were first published from his specimens. The third genus, *Dendroseris*, was founded upon a specimen of one species collected in Masafuera by Cuming. The arboreous Compositæ which constitute the most peculiar element in the native vegetation were published, partly by Decaisne,[3] and partly by De Candolle; and Colla[4] published descriptions and rude figures of a large number of Bertero's Chilian and Juan Fernandez plants. Fortunately, he cites in full the inscriptions on Bertero's labels, thus greatly facilitating the identification of many of them.

Here follows the substance of Bertero's sketch of the vegetation, in which are intercalated the names of the plants adopted in this work.

The country was very well wooded, but the species of trees were few in number. The Canelo (*Drimys chilensis*) [*Drimys confertifolia*], the Mayu (*Zanthoxylum mayu*), and the Luma or Temu (*Myrtus?*) [*Myrtus fernandeziana*] were the commonest; some of the trees were of a prodigious size. Sandalwood was only found in a dead condition, and usually half-buried in the earth. Proficients state, he says, that it is of better quality than that of the Sandwich Islands.

Although in the same latitude as Valparaiso, Juan Fernandez possesses a markedly different vegetation, approaching, perhaps, nearer to that of Chiloe Island; yet there were some Californian[5] and a few New Zealand plants—*Tetragonia expansa*, the *Zanthoxylum*, three species of *Peperomia*, and three species of tree-ferns are examples. Twelve to fifteen species of ferns had taken possession of more than half of the ground; the rest was either wooded or wholly denuded of plants. A Palm, known in the country by the name of "Chonta," inhabited the slopes of the highest mountains. Bertero did not see the flower before it was blown, but believed this Palm should constitute a new genus.

Resina, highly estimated in Chili on account of its reputed medicinal properties, is a

[1] Notice sur l'Histoire naturelle de l'île Juan Fernandez, extraite d'une lettre de M. Bertero: *Annales des Sciences Naturelles*, xxi. 1830, p. 344.

[2] Caldcleugh in Hooker's *Botanical Miscellany*, iii. p. 303.

[3] Guillemin's *Archives de Botanique*, i. et ii., and Delessert's Icones Selectæ Plantarum, iv.

[4] Plantæ Rariores in Regionibus Chilensibus a Clarissimo M. D. Bertero nuper detectæ et ab A. Colla in lucem editæ.—*Memorie della Reale Accademia della Scienze di Torino*, xxxvii., 1834, pp. 41–85; xxxviii., 1835, pp. 1–42, 117–142; xxxix., 1836, pp. 1–56.

[5] This is a mistake; the two or three ferns Bertero supposed to be the same as Californian are not so.

gum-resin yielded by a small tree which he took to be a *Senecio*. This resin exudes from the branches and trunk, and under the influence of the air it solidifies and becomes brittle; and when thrown into fire it exhales an odour like that of incense. Two kinds were distinguished, called "Resina macho" and "Resina hembra" [literally male and female resin —*Robinsonia thurifera* and *Robinsonia gayana* respectively]. The product of the Macho was called "Resina," and that of the Hembra "Incensa." Bertero was of the opinion that there might be two species confounded, for the leaves of the latter are narrower, the disk-flowers are yellow, and the ray-flowers deep red, and the heads in cymes, while in the former the flower heads are corymbose and wholly yellow. Another small tree of the same genus, called "Resinilla," is a new species [*Robinsonia gracilis*]; this affords no resin. A rather tall tree of the Eupatoriaceæ seemed to him to be totally unknown [*Rhetinodendron berteroi*]; it also furnished a gum-resin having the odour of incense. *Myrtus ugni* of Molina [*Myrtus selkirkii*] was found on the high mountains. *Hippotis triflora* [*Coprosma*], a tree of medium size, was very common; and the tree called Peralillo [*Psychotria pyrifolia*] belongs to the same family. It has a trunk four times larger than that of the *Hippotis*. What was called "Manzano" in the island is a species of tree-nettle [*Bœhmeria excelsa*] growing from ten to twenty feet high. He also found a *Plantago* near *Plantago princeps* [a Sandwich Island species], but different. The Arrayan macho or espinillo [*Rhaphithamnus longiflorus*] is a tree of medium size bearing a fleshy fruit. The Guyacan [*Sophora tetraptera*] differs from the Mayu of Chili in the shape of its leaves; besides, its trunk is of considerable size, while the latter is shrubby. The name *spartioides* was given to an arboreous species of *Colletia* having small and few leaves and white flowers tinged with rose. *Lobelia tupa* was very common; its root is perennial, but the stems are renewed yearly after producing very large flowers of a dazzling red. Another herbaceous species [*Lobelia anceps*], always found growing in clefts of rocks near the sea, was in his opinion new. *Malva umbellata*,[1] and a shrubby *Atriplex*,[2] which he did not see in flower, were only found in Goat Island. A species of *Tillandsia* or of a closely allied genus was met with in the highest mountains, and a *Bromelia* near *Bromelia discolor* was very common on dry exposed rocks, and *Azara "serrata"* was frequent in woods. *Lessonia* [*Eryngium bupleuroides*], a genus of Umbelliferæ near *Astrantia* or *Sanicula*, was a tree eight to ten feet high. A *Berberis* near *Berberis glauca* was known by the name of Michoy, and furnished a very pretty yellow dye. The *Arunda quila*, Molina? [*Chusquea fernandeziana*] was rather common; and the stem of *Gunnera scabra* [*Gunnera glabra* and *Gunnera peltata*] was found as much as ten feet high. The foliage, says Bertero, who confounded two species, is very variable, sometimes peltate, sometimes glabrous, smooth, and even shining. It was called "Panque," and abounded on the banks of streams and in mountain valleys. *Arbutus rigida* [*Pernettya*], known by the name of

[1] *Malva umbellata* (*Sphæralcea umbellata*) is a very showy Mexican plant, which does not grow in South America; and there are no Malvaceæ from Juan Fernandez in any of the collections seen.

[2] This is not in the Kew set of Bertero's plants.

Murtilla, was distinguished by the elegance of its habit. An *Escallonia*, with red flowers, was collected, and leaves of an indeterminable tree without a native name; two species of *Campanula*, one of which Bertero took to be *Campanula gracilis*, Forst. [really *Wahlenbergia berteroi*], and the other a distinct new species. Among the ferns were an arboreous *Lomaria* [*Lomaria procera*] and two or three herbaceous species; an arboreous *Davallia* [*Dicksonia berteroana*]; a *Cyathea*, or neighbouring genus [*Thyrsopteris*]; a genus near *Lycopodium*, and apparently very distinct [*Notarisia lycopodioides*, Colla = *Gottschea berteroana*]; various species of *Polypodium*, among them *Polypodium californicum* [*Polypodium translucens*], *Polypodium pruinatum* [*Alsophila pruinata*], and *Polypodium spectabile* [*Polypodium punctatum*]; a pretty *Aspidium*; *Nothochlæna nivea* [*Nothochlæna chilensis*—scarcely specifically different from *Nothochlæna nivea*]; and three species of *Asplenium*, including *Asplenium magellanicum*.

Salicornia peruviana was only found on the north side of the island. The Mosses, Lichens, and Fungi were very numerous, but it was impossible to determine them on the spot. *Phytoxys acidissima*, Molina? [*Cuminia*], a tree six to eight feet high, merits special study, Bertero says, and may be a different genus. Bertero then speaks of the species of *Rhetinodendron*, *Robinsonia*, and *Dendroseris*, of which he collected five or six species; but as the particulars are given further on under the genus, they may be omitted here.

Among exotic plants that had become thoroughly naturalised and so abundant as to have all the appearance of being indigenous, Bertero mentions *Melissa officinalis*, *Apium petroselinum*, several species of *Medicago*, *Avena sativa*, *Chenopodium anthelminthicum*, and *Physalis peruviana*, which furnished excellent fruit. The peach tree was so abundant that one could hardly form an idea of the quantity of fruit collected; and the fruit was generally good, notwithstanding the half-wild state of the trees. *Cestrum parqui* was frequent near dwelling-houses. Many other fruits were abundant; and *Fragaria chilensis* bore better fruit than in Chili.

Rats were exceedingly numerous, in spite of all that was done to keep them down, and they destroyed much fruit. Goats were present in incalculable numbers, and their flesh was of the most exquisite flavour; a few hogs existed in the valley of La Cueva. Horned cattle were almost extinct; and there were no horses. Domestic pigeons had become wild, and increased to an enormous extent. Very few insects were observed.

Mr Hugh Cuming was an Englishman, who resided for some time at Valparaiso, and afterwards devoted himself to the collection of objects of natural history in Chili, Peru, Panama, and the Philippine Islands, where he made very large collections of dried plants. He appears to have visited the islands, if not in company with Bertero, at least during the stay of the latter, but he did not make by any means so extensive a collection, and was probably there only for a few days. He also went to Masafuera.

The next in succession is Claude Gay, the author of the Flora Chilena, who spent a fortnight in Juan Fernandez early in the year of 1832, and collected what plants he could

at that season. He published [1] some particulars of this collection, which was deposited in the Paris Museum of Natural History. Although the time was short, he met, he says, with many interesting plants, including three or four species of tree-ferns, which were overrunning more and more ground, a new genus of *Drimys*, a *Myrtus*, which he thought might be *Myrtus ugni*, Molina [doubtless *Myrtus selkirkii*], an Urticaceous tree, called "Manzano," a fine *Sophora*, two species of *Gnaphalium*, a *Campanula* [*Wahlenbergia*], a *Zanthoxylum*, an *Arbutus* [*Pernettya*], and even two species of Piperaceæ. He also observed that the Juan Fernandez resin, so famous throughout Chili and Peru, though still unknown to science, was exuded by a new genus of Compositæ, near *Senecio*. Among other plants was a very fine series of ferns, which were very common in the island; "but my most important botanical discovery," he adds, "was five or six species of a genus belonging to the Cichoriaceæ, all of them woody, and ten to twelve feet high." In this discovery, as appears from Bertero's sketch of the vegetation of the island, published three years earlier, he had been anticipated; indeed, Don had already published the genus *Dendroseris* on specimens of a species collected in Masafuera by Cuming.

Mr Philibert Germain, formerly conservator of the Natural History Museum at Valparaiso, paid a visit to Juan Fernandez in 1854, and was there during the latter part of October and the beginning of November, as we learn from Dr R. A. Philippi.[2] There are only a few of Germain's plants at Kew, but, from what Philippi says, he must have made an extensive collection. As already observed, there is no direct evidence in Philippi's writings that he has ever visited the island; yet some of the information in the Bemerkungen does not read like second-hand. In the place cited he enumerates 137 [3] vascular plants, belonging to forty-three orders, or an average of about three species to each order. Among them are thirty-six species of ferns, constituting 26·3 per cent. of the whole; twenty-three Compositæ = 16 per cent.; and ten Gramineæ = 7 per cent. Philippi's list includes, besides several certainly introduced plants, such as *Rumex acetosella*, *Aira caryophyllea*, and *Anthoxanthum odoratum*, descriptions of twenty-eight proposed new species, several of which are regarded as varieties in this work, whilst a few others are synonyms of previously described species, as subsequently ascertained in part by Philippi himself. A few notable omissions are inexplicable, such, for instance, as *Balbisia* [4] (*Rhetinodendron*) and *Lobelia tupa*, except that they were overlooked in the haste of compilation. We extract a few particulars relating to the condition of the vegetation at that date. The

[1] Aperçu sur les recherches d'histoire naturelle faites dans l'Amérique du sud, et principalement dans le Chili, pendant les années 1830 et 1831, *Annales des Sciences Naturelles*, xxviii. pp. 369–393.

[2] Bemerkungen über die Flora der Insel Juan Fernandez, *Botanische Zeitung*, September 1856, pp. 625–636, 641–650, 818–819. This article was originally read before the Universidad de Chile on July 12, 1856, and published in Spanish in the July number (1856) of the *Anales de la Universidad de Chile*. There is also a French version in the *Annales des Sciences Naturelles*, série 4, vii. p. 87.

[3] Since the publication of this list, Dr Philippi has proposed and described a number of new species of Juan Fernandez plants in various periodicals.

[4] Subsequently mentioned by him in his general remarks on the vegetation.

western half, which is relatively low, flat, and dry, was almost treeless, while the eastern half, especially the northern declivity, was almost entirely covered with shady evergreen forests, above which waved the graceful leaves of the slender Chonta Palm. These recalled the beautiful groves of the southern provinces of Chili, yet they were at once distinguishable by the absence of underwood and climbing plants, which render the forests of Valvidia so impenetrable, as well as by the enormous quantities of ferns, whose fallen fronds thickly covered the ground.

Since that date, however, the trees have been very extensively felled, and the time is probably not far distant when all accessible parts will be denuded.

Philippi remarks that not a single shrub or tree is common to Juan Fernandez and the mainland of South America; but he regards the insular form of *Sophora* as distinct both from the Chilian and the New Zealand. If none be common to Chili and Juan Fernandez, there are several insular species which are closely allied to continental ones; thus *Drimys*, *Berberis*, *Azara*, *Gunnera*, *Myrtus*, *Psychotria*, *Pernettya*, *Rhaphithamnus*, and *Loranthus*. The same thing obtains for many of the herbaceous genera, and what is very remarkable, in nearly all instances the insular species are handsomer and especially larger-flowered than the corresponding continental ones.

The collection of plants in the Kew Herbarium made by Mr E. C. Reed was purchased in 1873, and we learn from the labels that he was in Masafuera in 1869, and in Juan Fernandez in 1872, but there are no other particulars.

Finally, there is the collection made by Mr Moseley in his capacity of naturalist to the Challenger Expedition. This, including a few introduced species, comprises 105 species of vascular plants, besides a small number of cellular cryptogams. It contains no novelties among the vascular plants except a *Wahlenbergia*, which, however, was represented in the Kew Herbarium by one specimen collected in 1823 by Mrs Graham, though hitherto not distinguished from *Wahlenbergia fernandeziana*. But, considering the number of botanists that have visited the island, novelties were not to be expected; and the fuller material it contains of many rare species is most welcome and useful.

Mr Moseley's remarks[1] on the vegetation give an idea of its condition ten years ago, and afford the latest published information on the subject. They are reproduced here with some slight modifications, such as the substitution of different botanical names in a few instances where a critical examination of the plants has brought to light the fact that they had not been correctly identified.

"The voyage to Juan Fernandez occupied six weeks, as we had the bad fortune to be becalmed for twelve days on the passage. It was with the liveliest interest that we approached the scene of Alexander Selkirk's life of seclusion and hardship, and an island with the existence of which, in the case of most of us, the very fact that we were at sea on a long voyage was more or less distinctly connected. The study of Robinson Crusoe certainly first gave me a desire to go to sea, and Darwin's Journal settled the matter. Defoe was obliged to lay the scene of his romance in the West Indies

[1] Notes by a Naturalist on the Challenger, pp. 537–542.

in order to bring in the Carib man, Friday. He thus gained the parrot, but he lost the sea-elephants and fur-seals of Juan Fernandez, one of the latter of which would have made a capital pet for Crusoe.

"The island is most beautiful in appearance. The dark basaltic cliffs contrast with the bright yellow-green of the abundant verdure; and the island terminates in fantastic peaks, which rise to a height of about 3000 feet. Especially conspicuous is a precipitous mass which backs the view from the anchorage at Cumberland Bay, and which is called from its form 'El Yunque' (the anvil).

"There are upwards of twenty-four species[1] of ferns growing in this small island, and in any general view the ferns form a large proportion of the main mass of vegetation. Amongst them are two tree-ferns, one of which I only saw amongst the rocks in the distance, but could not reach. The preponderant ferns, especially the tree-ferns, give a pleasant yellow tinge to the general foliage. Curiously enough, the almost cosmopolitan common brake-fern (*Pteris aquilina*) does not occur in the island. Four species of the ferns out of the twenty-four present are peculiar to the island, and one, *Thyrsopteris elegans*, is of a genus which occurs only here. The appearance of this fern is very remarkable, for the cup-shaped sori hang down from the fronds in masses, looking just like bunches of millet seed.

"Everywhere, for the first few hundred feet, trees are absent, the wood having been all felled. In 1830 a large quantity of dry old sandalwood still remained in the valleys; but even then there were no growing sandalwood trees remaining. No doubt the general appearance of the vegetation is very different now from what it was when the island was first visited.

"I landed and climbed with a guide a steep path leading directly up from the bay to Selkirk's Monument. The island is rented from the Chilian Government as a farm by a Chilian who employs a number of labourers and rears cattle, and grows vegetables, doing a very fair trade with passing vessels, the crews of which, like our own, after a voyage from such a port as Tahiti, long for a little wholesome fresh food. A considerable sum is also realised by the sale of the skins of the fur-seals. Close to the farmhouse at the bay still remain a row of old caves dug out in the hillside by the buccaneers.

"In ascending the path the first tree was met with at about 700 feet altitude, all below had been cut down. We passed through a hollow overgrown by a dense growth of the gigantic rhubarb-like *Gunnera peltata*. Darwin remarked on the large size of the leaves of this plant and height of its stalks as seen by him in Chili.[2] The stalks of the plants he saw were not much more than a yard in height. In this hollow the stalks must have been seven feet in height. We walked through a narrow passage cut in a thicket of them with the huge circular leaves above our heads. The leaves catch and hold a large quantity of rain-water. The size attained by the *Gunnera* varies with its situation. In many places the leaves are very conspicuous on the hill-slopes, crowding closely as an undergrowth, and not rising high above the ground.

"It was now spring in Juan Fernandez, as at Tahiti. Most excellent strawberries grow wild about the lower slopes of the island, and especially well on banks beneath the cliffs close to the sea-shore. The strawberries are large and fine, but white in colour, being, I believe, a Spanish cultivated variety. If so, they have not all reverted to the parent wild form, either in colour or size; a few only were just beginning to ripen.

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[1] Altogether forty-four species are recorded from the island, of which eight are apparently endemic.—W. B. H.

[2] Journal of Researches during the Voyage of H. M. S. "Beagle," p. 279. London, 1879.

"At this time of the year the foliage of the myrtles, though evergreen, looks half-dead, and these trees thus show out conspicuously amongst the rest. Here and there examples of the Magnoliaceous tree (*Drimys confertifolia*), a tree closely allied to one common in the Straits of Magellan, were covered with showy white flowers, and large patches of a small species of dock (*Rumex*) in full flower showed out red amongst the general green, whilst a white-flowered Iridaceous plant (*Libertia formosa*) growing socially formed well-marked patches of white. A tall Verbenaceous shrub (*Rhaphithamnus longiflorus*) which was very common was covered with dark blue tubular flowers.

"Hovering over the flowering bushes and trees, were everywhere to be seen two species of humming-birds; one of which (*Eustephanus fernandensis*) is peculiar to the island, whilst the other (*Eustephanus galeritus*), of the same genus, occurs also on the mainland. A further closely allied but peculiar species occurs in the island named by the Spaniards Masafuera, or "farther out," because it lies ninety miles to the westward of Juan Fernandez and so much farther from the Chilian coast.

"The humming-birds were extremely abundant, hovering in every bush. In the species peculiar to the island of Juan Fernandez, the male is very different in plumage from the female, being of a chocolate colour, with an iridescent golden-brown patch on the head, whilst the female is green. So different are the two sexes that they were formerly supposed to represent two distinct species, as has happened in the case of so many other birds. This endemic humming-bird seemed more abundant than the continental one. Any number of specimens might have been shot.

"In skinning some of the birds which I killed, I noticed that the feathers at the base of the bill and on the front of the head were clogged and coloured yellow with pollen. The birds, no doubt, in common with other species of humming-birds and other flower-frequenting birds, such as the Myzomelidæ, are active agents in the fertilisation of plants. I noticed pollen attached in a similar manner to the Swallow-shrike (*Artamus leucopygialis*), at Cape York. Mr Wallace concludes that the presence of these birds, as fertilisers, accounts for the abundance of conspicuous flowers in Juan Fernandez.

"There are very few insects in the island, according to the observations of Mr E. C. Reed, and only one very minute species of bee. Flies, of which there are twenty species, form the most prominent feature of the entomology of the island. Some fertilisers, either insects or birds, must act on a very comprehensive and effectual scale all over the island, as follows from the abundance of fruit yielded by the various introduced plants.

"Strawberries, cherries, peaches, apples, and figs bear well; strawberries and peaches at all events very abundantly. The wild peaches are spreading everywhere. These, the cherries and the apples, are possibly fertilised by the birds, but one would hardly suppose that the strawberries would be also thus pollenised; though at a height of 9000 feet in the Andes, I have watched humming-birds, possibly the same species as that at Juan Fernandez, hovering over the low mountain flowers, quite close to the ground, where nothing like a bush was growing.

"It would be very interesting, if it proved to be the case, that humming-birds have in this distant island adapted themselves to the fertilisation of our common garden fruits. Besides the fruit trees, there are many introduced plants with well-developed flowers which thrive in the island; a thistle is very abundant and luxuriant, as if eager to remind travellers to what race the world owes the immortal Selkirk, and a wild turnip is rapidly spreading. Possibly the abundant flies take some share in the fertilising work.

"It must be remembered, with regard to insular floras, that a plant which had developed showy

flowers to attract certain insects on some mainland or other place where insects were abundant, might, when transferred to an island devoid of insects suitable to its requirements, nevertheless retain its gaudy flowers, little, or not at all impaired, for an indefinite period, just as animals which have taken to deep-sea life have some of them retained their colours, though living in the dark.[1]

"Selkirk's Monument is placed on the crest of a short sharp ridge in a gap in the mountains at a height of about 1800 feet above the sea. From this, a steep descent leads down on either side to the shore. Here Selkirk sat and watched the sea on both sides of the island in long-deferred hope of sighting a sail.

"Here we rested for some time enjoying the view. Juan Fernandez is only ten miles in length, and twenty square miles in area, and from this elevated point nearly the whole extent of the island could be overlooked. Yet this tiny spot of land contains birds, land-shells, trees, and ferns which occur nowhere else in the vast expanse of the universe, except here or in the neighbouring Masafuera. One could almost count the number of trees of the endemic palm (*Juania australis*), and estimate the number of pairs of the endemic humming-bird existent, at a bird for every bush. Two of the species of land-birds, and all the twenty species of land-shells of the island, are endemic.

"The temperature at the monument at 11 A.M. was 65° F. A small bat, possibly disturbed by the sound of the gun, was seen to fly past. The common sow-thistle (*Sonchus oleraceus*), the ubiquitous weed, has climbed up the pass, and grows by the monument. The endemic palm has been almost exterminated, excepting in nearly inaccessible places, as on a rock above the monument, where a group of the trees can be seen but not reached.

"The terminal shoot of the palm, especially when cut just before the tree flowers, is excellent to eat; the developing leaf mass being quite white, and tasting something like a fresh filbert. It seemed to me more delicate than that of the shoot of the cocoa-nut. The guide knew where there was a tree remaining in the woods not far above sea-level, and I went with him to it hoping to find it in flower. As it was not, I cut it down for eating, for the guide was only waiting to let it develop further before felling it for that purpose himself. A few seedling palms grew near by.

"Most remarkable in appearance amongst the endemic arboreous Compositæ are the species of the genus *Dendroseris*, allied to our chicory. The specimens which I saw in flower were rather large straggling shrubs than trees, but with thick woody stems, and branches from ten to fifteen feet in height. The leaves are very like those of a dandelion in appearance, and the stem, which, when split open, has a curiously chambered pith, has just the smell of a dandelion root, and would no doubt yield chicory. It pours out, like the dandelion and allied plants, a milky juice when cut.

"The flesh of the wild goats of the island is most excellent eating, no doubt because of the abundance of their food. In some parts of the island, especially to the south-west, there are open stretches covered with long grass. Pigeons (*Columba œnas*), which are said to have been imported into the island, are common, and feed on the hill-sides in flocks."

The Sandalwood of Juan Fernandez.

Several of the earlier writers allude to the presence of sandalwood in Juan Fernandez, yet no specimen of any kind exists in any of the collections of the plants at Kew or the British Museum. Molina[2] says "the island of Juan Fernandez produces the red, yellow,

[1] Wallace, Tropical Nature, p. 274. London, 1878.

[2] The Geographical, Natural, and Civil History of Chili, English edition, London, 1809, i. p. 137.

and white sandal, the yellow wood, or *Fagus lutea*,[1] and a tree whose genus I am unacquainted with, that produces a species of pepper[2] inferior to that of the East Indies." Beyond this general statement he says nothing, so that we have no evidence that there were living sandalwood trees in the island at the beginning of the present century; but the inference is that there were. Nevertheless, it would seem that nothing except specimens of the wood exist in any Natural History collection. In 1830 Bertero specially searched for it, though in vain. There was still plenty of decayed, half buried trunks. Gay[3] has a definite statement to the effect that it was all completely destroyed, or rather perished, in one and the same year, but he does not cite his authority for it. His words are: "En o tro tiempo [el Santal] era mùy comun en la isla de Juan Fernandez, pero perecieron todos en un mismo año y hoy no se encuentra sino troncos muertos; lo mismo sucedió en Inglaterra con el Plátano en el siglo 18." We are left to guess by what agency the sandalwood trees were destroyed, and as he cites the destruction of the true occidental plane in England as a parallel case, it might be supposed that excessive cold was the real or suspected agent. But such an event seems so very improbable that we shall dismiss it without further discussion. It is true that *Santalum album* inhabits a warmer climate, but, as Philippi remarks,[4] the Juan Fernandez sandalwood was almost certainly a different species, and most likely peculiar to the island. The Sandwich Island sandalwood (*Santalum freycinetianum* and *Santalum pyrularium*) and the Fiji sandalwood (*Santalum yasi*) are quite distinct from the tropical Asian *Santalum album*. Yet, as already observed, there is no proof that the Juan Fernandez sandalwood was a *Santalum*. Assuming it to be a species of *Santalum*, it would, in the present distribution of the genus, be a very remote outlier. Unfortunately, there is no specimen of the wood at Kew, so there is no opportunity of examining its structure and comparing it with other kinds of sandalwood. In the place cited above, Philippi states that in 1856 there were still many portions of trunks of sandalwood scattered about the island up to the highest summits of the cliffs, but so weather-worn that only the heart-wood remained. Such a fragment was in the museum at Santiago indicating a tree two feet in diameter. Now, *Santalum album* never, we believe, attains such large dimensions; a diameter of eighteen inches being very uncommon even where it grows most vigorously. Respecting the extinction of the Juan Fernandez sandalwood tree, Philippi says he is utterly unable to account for it. A volcanic disturbance would not single out a certain species, but destroy whole forests; and then it is quite inconceivable that the seed in the ground could be killed by such an agency. He further states that the pieces of sandalwood found in the island often exhibit holes, which are evidently the work of the larva of some Goat-chafer; but at the present time there are no traces in the island of a Goat-chafer of so large a size. The agent of destruction will probably remain unknown, as also of the innumerable dead prostrate trees observed in South Trinidad by Dr Copeland. A

[1] *Zanthoxylum mayu.*—W. B. H.
[2] *Lactoris fernandezia.*—W. B. H.
[3] Flora Chilena, v. (1849), p. 326.
[4] *Botanische Zeitung*, 1856, p. 635.

similar fate seems to be overtaking the Capuchin tree (*Northia seychellarum*) of the Seychelles, where the dying trees of this species are one of the most striking features in the landscape.

With regard to the fact of no seedlings appearing after the whole of the growing generation had been killed or had died off naturally, it may be accounted for in a variety of ways, though the real cause may be overlooked. If Gay's statement that the trees were all killed in one year be correct, the circumstance of not a single seedling surviving in any part of the island is indeed quite inexplicable; for, assuming the goats to be very fond of this particular plant in a young state, there are surely nooks inaccessible even to goats. But the extinction of the Juan Fernandez sandalwood was probably due to another cause. Many of the Santalaceæ are known to be root-parasites at an early stage of their existence, if not throughout life, and it is very likely that future investigations will prove that most, if not all, of the members of this order are of the same nature. Dr G. King, superintendent of the Calcutta Botanic Garden, assures us, from his own observation, that *Santalum album* is sometimes, at least, parasitic on the roots of other plants when young. This assertion is borne out by the frequent failure of cultivators to raise seedlings of this plant when its seeds are sown alone, and also by the fact that its usual habitat in a wild state is in hedges and thickets. Dr Brandis[1] mentions that it grows in gardens in various parts of India, and he adds that it is mainly spread through the agency of birds, and springs up abundantly in hedges and in the midst of shrubs. But that it is not always so is evident from the fact that germinating seeds sent from Ceylon to Mauritius in 1877 have since grown and fruited twice a year. On the other hand, as we learn from an article in the current volume of the Indian Forester, decaying vegetable matter is necessary for the successful raising of seedling sandalwood. The editor of the serial named inserts the following note (p. 205) on this subject:—"Colonel Doveton, conservator of forests, found sandal seedlings growing as a root-parasite on the wild date palm (*Phœnix sylvestris*); and such seedlings were more vigorous than others rooted independently in the soil." Nadeaud states that the Tahitian Sandal wood (*Santalum insulare*, Bertero) is parasitic on the roots of other trees, usually on *Commersonia eclimata* or *Alphitonia ziziphoides*.[2]

At Kew seedlings are frequently raised, but they are always very slender, and after reaching about a foot in height they die. A few years ago, however, a plant of considerable size existed in the gardens, the history of which we have not been able to ascertain. It would be interesting to have the life-history of *Santalum album* thoroughly investigated.

To return to the sandalwood of Juan Fernandez. The most probable cause of its extinction was the absence of the conditions necessary for its reproduction from seed. The enormous flocks of goats may have indirectly contributed to the destruction of the sandalwood by consuming the nurse plant. Root-parasites, speaking generally, seem to be able to

[1] Forest Flora of North-West and Central India, p. 399.

[2] Énumération des Plantes Indigènes de l'Ile de Tahiti, p. 47.

prey only upon certain plants, in the absence of which their seeds perish. Should the extinction be due to the cause assigned, then the process would be a gradual one, and not consummated in a single season. Of course, the soundness of the foregoing argument depends upon the odoriferous wood of Juan Fernandez being a true *Santalum*, or a tree of the same nature. Whether the specimen of the wood preserved at Santiago be sufficient to decide this point is uncertain.

Since writing the foregoing, we have accidentally come upon a note by Philippi, in which he states that he is informed by Commander Simpson, of the Chilian navy, that the tree-fellers of Juan Fernandez had lately felled a living tree of the sandalwood, the trunk of which was eighteen inches in diameter.[1].

An Analysis of the Phanerogamic and Fern Vegetation of Juan Fernandez and Masafuera.

The foregoing paragraphs contain the substance of the botanical results separately of the various travellers who have visited the islands, and we are now in a position to deal with these results collectively, and give a general review of the flora.

Table showing the Geographical Distribution of the Vascular Plants of Juan Fernandez and Masafuera, including a few probably naturalised Species, which are indicated below.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
MAGNOLIACEÆ.				
Drimys confertifolia	Tree	×	...	Endemic.
BERBERIDEÆ.				
Berberis paniculata	Shrub	×	...	Endemic.
Berberis corymbosa	Shrub	×	...	Endemic.
CRUCIFERÆ.				
Cardamine chenopodifolia	Herb	×	...	Uruguay and Entre Rios.
Cardamine flaccida	Annual herb	×	...	South America; and closely allied forms widely spread.
BIXINEÆ.				
Azara fernandeziana	Shrub	×	...	Endemic.
CARYOPHYLLEÆ.				
Stellaria cuspidata	Herb	×	...	Mexico to Chili, and very near the Old World *Stellaria nemorum*.
Sagina chilensis	Annual herb	×	...	Common in Chili.
Spergularia rubra	Annual herb	×	×	Widely spread in temperate regions.
PORTULACEÆ.				
Monocosmia corrigioloides	Annual herb	×	...	Common in Chili.
GERANIACEÆ.				
Oxalis laxa	Herb	×	...	Common in Chili.
RUTACEÆ.				
Zanthoxylum mayu	Shrub	×	...	Endemic.

[1] *Botanische Zeitung*, 1870, p. 502.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
RHAMNACEÆ.				
Colletia spartioides	Small tree	×	...	Endemic.
LEGUMINOSÆ.				
Sophora tetraptera	Tree	×	×	South America; Easter Island; New Zealand.
ROSACEÆ.				
Fragaria chilensis	Herb	×	...	Chili; Western North America; Sandwich Islands.
Margyricarpus setosus	Under shrub	×	...	Andes, from New Grenada southward, and extratropical South America.
Acæna argentea	Herb	×	...	Chili.
SAXIFRAGEÆ.				
Escallonia callcottiæ	Shrub	×	...	Endemic.
HALORAGEÆ.				
Haloragis alata	Herb	×	...	New Zealand; Eastern temperate Australia.
Gunnera insularis	Herb	×	...	Endemic.
Gunnera bracteata	Arboreous in habit	×	...	Endemic.
Gunnera peltata	Arboreous in habit	×	...	Endemic.
MYRTACEÆ.				
Myrtus fernandeziana	Tree	×	...	Endemic.
Myrtus selkirkii	Tree	×	...	Endemic.
FICOIDEÆ.				
Tetragonia expansa	Herb	×	...	Australia; New Zealand; Japan; South America?
UMBELLIFERÆ.				
Eryngium bupleuroides	Small tree	×	...	Endemic.
Eryngium sarcophyllum	Shrub or small tree	...	×	Endemic.
Sanicula liberta	Herb	×	...	Chili and Peru.
Daucus australis	Biennial herb	×	...	Chili.
RUBIACEÆ.				
Coprosma triflora	Shrub	×	...	Endemic.
Psychotria pyrifolia	Tree	×	×	Endemic.
COMPOSITÆ.				
Erigeron fruticosus	Half shrub	×	×	Endemic.
Erigeron rupicolus	Half shrub	...	×	Endemic.
Micropsis nana	Annual herb	×	...	Chili.
Gnaphalium cheiranthifolium	Herb	×	...	Widely spread in South America.
Gnaphalium insulare	Herb	...	×	Endemic?
Gnaphalium fernandezianum	Herb	×	×	Probably = *Gnaphalium berterianum*, a Chilian species.
Galinsoga parviflora	Annual herb	×	...	A common weed in America.
Rhetinodendron berteroi	Shrub or small tree	×	...	Endemic.
Robinsonia evenia	Shrub or small tree	×	...	Endemic.
Robinsonia gayana	Shrub or small tree	×	...	Endemic.
Robinsonia gracilis	Shrub or small tree	×	...	Endemic.
Robinsonia longifolia	Shrub or small tree	×	...	Endemic.
Robinsonia macrocephala	Shrub or small tree	×	...	Endemic.
Robinsonia thurifera	Shrub or small tree	×	...	Endemic.
Dendroseris berteriana	Shrub or small tree	×	...	Endemic.
Dendroseris macrophylla	Shrub or small tree	×	×	Endemic.
Dendroseris marginata	Shrub or small tree	×	...	Endemic.
Dendroseris micrantha	Shrub or small tree	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
Dendroseris mollis	Shrub or small tree	×	...	Endemic.
Dendroseris neriifolia	Shrub or small tree	×	...	Endemic.
Dendroseris pinnata	Shrub or small tree	×	...	Endemic.
Dendroseris sp. ?	Shrub or small tree	×	...	Endemic.
CAMPANULACEÆ.				
Lobelia anceps	Herb	×	...	Extratropical South America; South Africa; Australia; New Zealand.
Lobelia tupa	Herb	×	...	Chili and Peru.
Wahlenbergia fernandeziana	Herb or half shrub	×	...	Endemic.
Wahlenbergia grahamæ	Herb or half shrub	×	...	Endemic.
Wahlenbergia tuberosa	Herb	...	×	Endemic.
Wahlenbergia berteroi	Herb	×	...	Endemic.
ERICACEÆ.				
Pernettya rigida	Shrub	×	×	Endemic.
PRIMULACEÆ.				
Centunculus pentandrus	Annual herb	×	...	West Indies; Central and South America; Africa; East Indies; Australia.
POLEMONIACEÆ.				
Collomia gracilis	Herb	×	...	British Columbia to California, and in Chili.
BORAGINEÆ.				
Selkirkia berteroi	Shrub	×	...	Endemic.
CONVOLVULACEÆ.				
Calystegia tuguriorum	Herb	...	×	Chili; New Zealand.
SOLANACEÆ.				
Solanum tuberosum	Herb	×	...	South America.
Solanum fernandezianum	Herb	×	...	Perhaps a wild form of *Solanum tuberosum*.
Solanum furcatum	Herb	×	...	Peru.
Physalis pubescens	Herb	×	...	Now widely dispered.
Nicotiana cordifolia	Herb	×	...	Endemic.
SCROPHULARINEÆ.				
Mimulus parviflorus	Herb	×	...	Chili.
VERBENACEÆ.				
Rhaphithamnus longiflorus	Small tree	×	×	Endemic.
Rhaphithamnus serratifolius	Small tree	×	...	Endemic.
LABIATÆ.				
Cuminia brevidens	Tree	×	...	Endemic.
Cuminia eriantha	Tree	×	...	Endemic.
Cuminia fernandezia	Tree	×	...	Endemic.
PLANTAGINEÆ.				
Plantago fernandezia	Miniature tree	×	...	Endemic.
CHENOPODIACEÆ.				
Roubieva multifida	Herb	×	...	South America.
Salicornia peruviana	Herb	×	×	Western South America.
PIPERACEÆ.				
Lactoris fernandezia	Shrub	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
Peperomia fernandeziana	Herb	×	...	Endemic.
Peperomia berteroana	Herb	×	...	Endemic.
Peperomia margaritifera	Herb	×	...	Endemic.
SANTALACEÆ.				
Santalum sp.?	Tree	×	...	Uncertain.
LORANTHACEÆ.				
Loranthus berteroi	Shrub	×	...	Endemic.
EUPHORBIACEÆ.				
Dysopsis gayana	Herb	×	...	Chili; Patagonia.
URTICACEÆ.				
Urtica masafueræ	Herb	...	×	Endemic?
Urtica glomerulæflora	Shrub	×	...	Endemic.
Boehmeria excelsa	Tree	×	...	Endemic.
Parietaria debilis	Herb	×	...	Widely dispersed.
BROMELIACEÆ.				
Ochagavia elegans	Herb	×	...	Endemic.
IRIDEÆ.				
Libertia formosa	Herb	×	×	Chili.
PALMÆ.				
Juania australis	Tree	×	...	Endemic.
JUNCACEÆ.				
Juncus microcephalus	Herb	×	...	Mexico to Uruguay and Chili.
Juncus acutus	Herb	×	...	Europe; Africa; South America.
Juncus dombeyanus	Herb	×	...	Chili.
Juncus chamissonis	Herb	×	...	South America.
CYPERACEÆ.				
Cyperus reflexus	Herb	×	...	South America.
Cyperus vegetus	Herb	×	...	South America.
Cyperus sp.	Herb	×	...	Uncertain.
Scirpus nodosus	Herb	×	...	Widely dispersed in the southern hemisphere.
Cladium scirpoideum	Herb	×	...	Endemic.
Uncinia douglasii	Herb	×	×	Endemic.
Carex paleata	Herb	×	×	Endemic.
GRAMINEÆ.				
Paspalum distichum	Herb	×	...	Widely dispersed, including Chili.
Phalaris intermedia	Herb	×	...	Carolina to Chili.
Stipa fernandeziana	Herb	×	...	Endemic.
Stipa bicolor	Herb	×	...	Extratropical South America.
Piptochætium bicolor	Herb	×	...	Mendoza, Monte Video.
Polypogon crinitus	Herb	×	...	Widely dispersed.
Nowodworskya imberbis	Herb	×	...	Endemic?
Chætotropis chilensis	Herb	×	...	Chili.
Trisetum laxum	Herb	×	...	Endemic?
Trisetum variabile	Herb	×	...	Widely diffused.
Pantathera fernandeziana	Herb	×	×	Endemic.
Podophorus bromoides	Herb	×	...	Endemic.
Bromus unioloides	Herb	×	...	Widely diffused.
Hordeum nodosum	Herb	×	...	Widely diffused.
Chusquea fernandeziana	Herb	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
FILICES.				
Gleichenia cryptocarpa	Herb	×	...	Chili to the Falklands.
Gleichenia revoluta	Herb	×	...	New Grenada to Chili.
Thyrsopteris elegans	Shrub	×	...	Endemic.
Alsophila pruinata	Tree	×	...	Mexico to Chili.
Dicksonia berteroana	Tree	×	...	Endemic.
Hymenophyllum cruentum	Herb	×	...	Chili to Patagonia.
Hymenophyllum dichotomum	Herb	×	×	South Chili.
Hymenophyllum fuciforme	Herb	×	...	Valdivia; Chiloe; Fuegia.
Hymenophyllum polyanthos	Herb	×	...	Widely dispersed in the Tropics, also common in New Zealand.
Hymenophyllum rarum	Herb	×	...	Chili; South Africa; New Zealand;
		×	...	Tasmania.
Hymenophyllum reniforme	Herb	×	...	Ecuador; Northern Peru.
Hymenophyllum subtilissimum	Herb	...	...	Extratropical South America; New Zealand.
Hymenophyllum tortuosum	Herb	×	...	Extratropical South America.
Hymenophyllum tunbridgense	Herb	×	...	Generally dispersed.
Trichomanes dichotomum	Herb	?	...	Valdivia?
Trichomanes exsectum	Herb	×	×	Valdivia; Chiloe.
Trichomanes pyxidiferum	Herb	×	...	Widely spread in warm regions.
Adiantum æthiopicum	Herb	×	...	Widely spread in warm regions.
Pteris comans	Herb	×	...	New Zealand; Australia; Polynesia.
Pteris chilensis	Herb	×	...	Chili.
Pteris incisa	Herb	×	...	Widely spread.
Pteris marattiæfolia	Herb	?	...	Chili.
Lomaria attenuata	Herb	×	...	Widely spread.
Lomaria blechnoides	Herb	×	...	Valdivia; Chiloe.
Lomaria lherminieri	Herb	×	...	West Indies to Chili.
Lomaria alpina	Herb	×	...	South temperate regions except South Africa.
Lomaria boryana	Herb	×	...	West Indies to Fuegia, Africa, Mascarene Islands.
Lomaria capensis	Herb	×	...	Widely dispersed.
Blechnum australe	Herb	×	...	Widely dispersed.
Asplenium lunulatum	Herb	×	...	Generally spread in warm regions.
Asplenium macrosorum	Herb	×	...	Endemic.
Asplenium magellanicum	Herb	×	...	Chili to Fuegia.
Asplenium obtusatum	Herb	×	...	South temperate regions.
Aspidium aculeatum	Herb	×	...	Generally diffused.
Aspidium capense	Herb	×	...	Tropics and south temperate regions.
Aspidium flexum	Herb	×	...	Endemic.
Nephrodium villosum	Herb	×	...	Peru; Chili.
Nephrolepis altescandens	Herb	×	...	Endemic.
Polypodium lanceolatum	Herb	×	...	Widely spread.
Polypodium punctatum	Herb	×	...	Widely spread.
Polypodium translucens	Herb	×	...	Endemic.
Polypodium masafueræ	Herb	...	×	Endemic.
Gymnogramme elongata	Herb	×	...	Mexico to Chili.
Nothochlæna chilensis	Herb	×	...	Endemic.

The 118 flowering plants in the foregoing table may be classified as follows:—Certainly indigenous, seventy; possibly indigenous, thirty-two; and very doubtfully indigenous, sixteen. It will occupy very little space to give the names of the plants belonging to each of these categories, and so they may follow here. The certainly indigenous element of the flora is restricted to the endemic species, which are:—*Drimys confertifolia*, *Berberis*

corymbosa, Berberis paniculata, Azara fernandeziana, Zanthoxylum mayu, Colletia spartioides, Escallonia callcottiæ, Gunnera insularis, Gunnera bracteata, Gunnera peltata, Myrtus fernandeziana, Myrtus selkirkii, Eryngium bupleuroides, Eryngium sarcophyllum, Coprosma triflora, Psychotria pyrifolia, Erigeron fruticosus, Erigeron rupicolus, Gnaphalium insulare, Gnaphalium fernandezianum, Rhetinodendron berteroi, Robinsonia evenia, Robinsonia gayana, Robinsonia gracilis, Robinsonia longifolia, Robinsonia macrocephala, Robinsonia thurifera, Dendroseris berteriana, Dendroseris macrophylla, Dendroseris marginata, Dendroseris micrantha, Dendroseris mollis, Dendroseris neriifolia, Dendroseris pinnata, Dendroseris sp.? *Wahlenbergia fernandeziana, Wahlenbergia grahamæ, Wahlenbergia tuberosa, Wahlenbergia berteroi, Pernettya rigida, Selkirkia berteroi, Solanum fernandezianum, Nicotiana cordifolia, Rhaphithamnus longiflorus, Rhaphithamnus serratifolius, Cuminia brevidens, Cuminia eriantha, Cuminia fernandezia, Plantago fernandezia, Lactoris fernandezia, Peperomia fernandeziana, Peperomia bertercana, Peperomia margaritifera, Santalum* sp.? *Loranthus berteroi, Urtica masafuerœ, Urtica glomerulæflora, Boehmeria excelsa, Ochagavia elegans, Juania australis, Cladium scirpoideum, Uncinia douglasii, Carex paleata, Stipa fernandeziana, Nowodworskya imberbis, Trisetum laxum, Pantathera fernandeziana, Podophorus bromoides,* and *Chusquea fernandeziana.*

These seventy species belong to forty genera and twenty-six natural orders, and are remarkable for the large proportion of trees and shrubs they include. Thus, deducting the grasses and sedges, of which there are nine species, out of the remaining sixty-one species, forty-six, or more than two-thirds, are shrubby or arboreous. Of trees affording timber for building and joinery, Philippi mentions *Drimys confertifolia, Zanthoxylum mayu, Myrtus fernandezianus, Sophora tetraptera,* and the species of *Cuminia. Rhaphithamnus,* one species of *Dendroseris, Eryngium bupleuroides,* and *Psychotria pyrifolia* also attain a considerable thickness of trunk, whereas the species of *Gunnera,* of *Robinsonia* and the Palm rarely have trunks more than eight inches through.

The additional possibly indigenous species[1] are:—* *Cardamine chenopodifolia,* * *Stellaria cuspidata,* * *Spergularia rubra,* * *Sophora tetraptera,* * *Fragaria chilensis,* * *Margyricarpus setosus, Acæna argentea,* * *Holoragis alata, Tetragonia expansa, Sanicula liberta, Gnaphalium cheiranthifolium, Lobelia anceps, Lobelia tupa, Calystegia tuguriorum,* * *Salicornia peruviana,* * *Dysopsis gayana, Parietaria debilis,* * *Libertia formosa,* * *Juncus microcephalus,* * *Juncus acutus,* * *Juncus dombeyanus,* * *Juncus chamissonis,* * *Cyperus reflexus, Cyperus vegetus, Scirpus nodosus, Paspalum distichum,* * *Stipa bicolor, Piptochætium bicolor,* * *Chætotropis chilensis,* * *Trisetum variabile,* and *Bromus unioloides.*

The very doubtfully indigenous species are:—*Cardamine flaccida, Sagina chilensis,*

[1] Those species preceded by an asterisk (*) have perhaps as strong claims to be considered indigenous as any plant not actually endemic can have.

Monocosmia corrigioloides, Oxalis laxa, Daucus australis, Micropsis nana, Galinsoga parviflora, Centunculus pentandrus, Collomia gracilis, Solanum tuberosum, Solanum furcatum, Physalis pubescens, Mimulus parviflorus, Roubieva multifida, Polypogon crinitus, and *Hordeum nodosum.*

In addition to the plants included in the foregoing list, Mr Moseley collected a number of evidently introduced species, as—*Ranunculus muricatus, Silene gallica, Stellaria media, Malva nicæensis, Geranium robertianum, Geranium dissectum? Ruta graveolens,* var. *bracteosa, Medicago denticulata, Lythrum græfferi? Bidens chilensis, Hypochæris glabra, Sonchus oleraceus, Plantago major, Rumex acetosella, Avena hirsuta, Poa annua, Briza minor, Festuca bromoides,* and *Festuca myurus.*

Amongst the seventy species classed as endemic are about half a dozen so near Chilian species that they might with equal propriety be regarded as races of the same species; these include apparently some of Philippi's species, such as *Gnaphalium insulare* and *Gnaphalium fernandezianum*, of which there are, however, no authentically named specimens at Kew. Making a slight deduction on this account, and adding about fifteen of the non-endemic wild species, concerning which there can be little doubt that they are indigenous, the number of indigenous flowering plants in Juan Fernandez and Masafuera would amount to about seventy-five.

Table showing the General Distribution of the Genera of Phanerogamic Plants of which there are Indigenous Species in Juan Fernandez or Masafuera.

Name.	Distribution.	Name.	Distribution.
1. Drimys . . .	Mexico to Brazil and Chili; New Zealand, Australia, New Caledonia, and mountains of Borneo.	11. Eryngium . .	Especially numerous in America from the southern United States to Chili; and generally dispersed in temperate and subtropical regions, except South Africa.
2. Berberis . . .	Temperate and subtropical regions of the northern hemisphere, including one species in Abyssinia, and in America, especially Western, from Oregon to Tierra del Fuego; but not represented in the Australasian region.	12. Coprosma . .	Most numerous in New Zealand and the Sandwich Islands; fewer in Oceania and Australia.
3. Cardamine . .	Temperate regions generally.	13. Psychotria . .	A very large genus, generally dispersed in the tropics; the greatest concentration of species in America.
4. Azara	Chili.		
5. Zanthoxylum .	Nearly all tropical and subtropical regions.	14. Erigeron . . .	Widely dispersed.
		15. Rhetinodendron	Endemic.
6. Colletia . . .	South America.	16. Robinsonia . .	Endemic.
7. Sophora . . .	Widely diffused in temperate and tropical regions.	17. Dendroseris . .	Endemic.
		18. Lobelia . . .	Generally diffused.
8. Escallonia . .	Andine and extratropical South America.	19. Wahlenbergia .	Widely dispersed; species most numerous in Africa; few in South America; several similar species in St Helena.
9. Gunnera . . .	Mexico to Patagonia; South Africa, Abyssinia, Java, Tasmania, New Zealand, and Sandwich Islands.	20. Pernettya . .	Mexico to Fuegia, and one or two species in New Zealand and Tasmania.
10. Myrtus . . .	Widely dispersed; the species most numerous in South America.	21. Selkirkia . . .	Endemic.
		22. Rhaphithamnus	Chili.

Name.	Distribution.	Name.	Distribution.
23. Cuminia . .	Endemic.	38. Cladium . . .	Widely dispersed in tropical and temperate countries; species most numerous in Australia and New Zealand.
24. Plantago . . .	Generally diffused.		
25. Salicornia . .	Generally diffused in maritime districts.		
26. Lactoris . . .	Endemic.	39. Uncinia . . .	South temperate and cold regions, and through the Andes to Mexico and the West Indies, also Sandwich Islands.
27. Peperomia . .	Widely dispersed in warm countries, with a great concentration of species in America.		
28. Santalum . .	Tropical Asia, Australia, and Pacific Islands.	40. Carex	Generally diffused.
		41. Stipa	Widely diffused.
29. Dysopsis . . .	Peru and Chili; monotypic.	42. Piptochætium .	The same as *Oryzopsis*, which has a wide range in the northern hemisphere, and recurs in South America.
30. Urtica. . . .	Widely diffused.		
31. Boehmeria . .	Widely dispersed in tropical and temperate regions.		
32. Ochagavia . .	Endemic (Order wholly American.)	43. Chætotropis. .	Chili.
33. Libertia . . .	Chili, Australia, and New Zealand.	44. Pantathera . .	Endemic.
34. Juania . . .	Endemic.	45. Podophorus . .	Endemic.
35. Juncus . . .	Cosmopolitan.	46. Chusquea . .	Panama and the West Indies to Chili.
36. Cyperus . . .	Generally dispersed.		
37. Scirpus . . .	Generally dispersed.		

Out of forty-six genera of flowering plants represented in Juan Fernandez, twenty are so generally diffused as not to be specially characteristic of any particular region, north or south, east or west; ten are endemic; seven are otherwise restricted to South America, or do not extend further north than Mexico; five (*Drimys, Gunnera, Pernettya, Libertia,* and *Uncinia*) are represented both in the Australian and South American regions; two (*Coprosma* and *Santalum*) are represented in the Australian but not in the South American region; and two (*Berberis* and *Piptochætium*) have a wide range in the northern hemisphere, extending southward, however, only in America, where the species of the former genus are numerous and diversified.

The Vascular Cryptogams.

Including *Trichomanes dichotoma*, Philippi, and *Pteris semiadnata*, Philippi = *Pteris marattiæfolia*, Hook., there are forty-four species of ferns in Juan Fernandez; but, as stated elsewhere, authentic specimens of these two ferns, direct from Philippi, in the Kew Herbarium, are labelled Valdivia, although with the published descriptions he records them both as natives of Juan Fernandez. The probabilities are that the labels are right and the published record wrong, for there are no specimens of either of them in the Kew Herbarium from the island, but there are some of the latter from Chili. Be this as it may, the fern vegetation of Juan Fernandez is much richer in species than that of St Helena, which comprises twenty-five species. On the other hand, the proportion of endemic species in Juan Fernandez is much smaller than in St Helena, there being at the outside only eight, or less than one fifth of the whole, whereas in St Helena half of the species are endemic. Upwards of thirty of the Juan Fernandez species also inhabit South America, many of them having a much wider range, while only one of the New Zealand species reaches Juan

Fernandez that does not reach Chili, namely, *Pteris comans*. The endemic element of Juan Fernandez offers nothing remarkable except the monotypic genus *Thyrsopteris*, which is perhaps as markedly characterised as any genus of ferns: the number of monotypic genera of ferns, as limited in Hooker and Baker's Synopsis, is small.

The total absence of the genus *Lycopodium*[1] is one of the most unexpected facts in connection with the vegetation of Juan Fernandez, for two or three species abound in most of the islands dealt with in the preceding parts of this work. The very widely spread *Psilotum* is apparently likewise wanting.

Very Rare or Extinct Plants.

A considerable number of species collected by Bertero in 1830, or by collectors who preceded him, are not in any of the more recent collections examined; hence it may be inferred that they are either very rare and local, or that they have disappeared altogether. They are:—*Colletia spartioides, Myrtus selkirkii, Psychotria pyrifolia, Robinsonia macrocephala, Robinsonia thurifera, Dendroseris berteriana, Dendroseris marginata, Dendroseris micrantha, Dendroseris mollis, Dendroseris neriifolia, Wahlenbergia berteroi, Peperomia margaritifera, Loranthus berteroi, Urtica glomerulaflora, Polypogon crinitus, Bromus cebadilla, Polypodium punctatum.*

Another proof of the very local occurrence of many of the species is the fact that several other species collected either before or since Bertero's time, are only found in one collection. A striking example is offered by *Podophorus*, a very distinct endemic monotypic genus of grasses, of which we have seen only one specimen sent to Kew by Dr Philippi. Again, *Robinsonia macrocephala*, Dene., collected by Gay, is in none of our collections.

The Plants of Masafuera.

There appears to be no published description of the general features of the vegetation of Masafuera, but it is evidently very scanty, and a fragment of the same flora as Juan Fernandez. The plants are:—*Spergularia rubra, Sophora tetraptera, *Eryngium sarcophyllum, Psychotria pyrifolia, Erigeron fruticosus, *Erigeron rupicolus, *Gnaphalium insulare, Gnaphalium fernandezianum, Dendroseris macrophylla, *Wahlenbergia tuberosa Pernettya rigida, Calystegia tuguriorum, Rhaphithamnus longiflorus, Salicornia peruviana, *Urtica masafuerae, Libertia formosa, Uncinia douglasii, Carex paleata, Pantathera fernandeziana, Hymenophyllum dichotomum, Trichomanes exsectum, *Polypodium masafuerae.*

Altogether, twenty-two vascular plants are recorded from Masafuera, and of these six are apparently peculiar; all the rest, except *Calystegia tuguriorum*, being common to this island and Juan Fernandez. We have seen no authenticated specimens of *Erigeron*

[1] *Lycopodium saururus* is recorded by Spring (Monogr. Lycop. ii. p. 7) from Cumberland Bay, Juan Fernandez; but, as the label in the Kew Herbarium indicates, it should have been Cumberland Bay, Kerguelen Island.

rupicolus, *Gnaphalium insulare*, and *Polypodium masafueræ*, but from the descriptions they are not markedly distinct from Juan Fernandez forms. Of the remarkable *Eryngium sarcophyllum*, there are only Cuming's specimens at Kew.

Concluding Remarks on the Flora of Juan Fernandez and Masafuera.

Although there is a disproportionately large endemic element, both generic and specific, in the vegetation of this island, its general affinities are decidedly Chilian, as an examination of the table (pp. 20, 21) will prove; and the number of genera common to the Tasmanian and New Zealand region and South America, represented in the island, strengthens the opinion, advanced elsewhere, that formerly the vegetation of each of the southern cold and temperate zones was essentially of the same composition throughout. Numerous other facts might be adduced in support of this theory, and there is one that strikes us as being strongly conclusive—namely, the generic identity of the principal trees of the existing colder forests of the two regions. Beech (*Fagus*) forests of different, though closely allied species, are as characteristic of New Zealand, Tasmania, and some parts of the mountains of temperate Australia as they are of Southern Chili and Patagonia. Furthermore, the Coniferous genera are the same in the two regions. Thus, the essential characters of the *Diselma* of Tasmania and *Fitzroya* of South America are said to be the same in the latest revision of the genera in Bentham and Hooker's Genera Plantarum, where the former is merged in the latter. Further, *Libocedrus*, *Dacrydium*, and *Araucaria* are all three represented in the Australasian and South American regions.

But in Juan Fernandez, as in St Helena, it is the endemic genera that offer the greatest difficulties to the botanical geographer; indeed, there are strong features of resemblance in the endemic genera as well as some of the species of the two islands—the genera of Compositæ and the species of *Wahlenbergia* are examples. We propose discussing the affinities and distribution of arboreous Compositæ in our general introduction; therefore we shall not enter into full particulars here, and only repeat what we have said of the St Helena arboreous plants belonging to this and other natural orders, that they are not specially insular, though they form so large a proportion of the floras of St Helena, Juan Fernandez, the Sandwich Islands, and some other islands. There are scores of them in South America, Africa, Madagascar, India, and Australia, from twenty to forty feet high, and more truly arboreous than the insular ones; and there are a few even taller. It is noteworthy that there are arboreous representatives of nearly every tribe or suborder of the Compositæ. Like the South African arboreous genera *Tarchonanthus* and *Brachylæna*, *Rhetinodendron* and *Robinsonia* are apparently diœcious, but the former are referred to the Inuloideæ, and the latter to the Senecionideæ. In habit, *Dubautia* (Helianthoideæ) of the Sandwich Islands is quite like the Juan Fernandez genera just named; while *Dendroseris* is in a manner repeated by the subarboreous species of *Sonchus* in the Canary Islands.

One peculiarity observed in dried specimens of some species of *Robinsonia* may be

mentioned, though it may possibly not be exhibited by the living plant. The pappus falls from the achenes while they are still in or attached to the receptacle, and the bracts of the involucre are apparently hygroscopic, and when dry, bend over the achenes and prevent them from being dispersed. Of course, this and many other points connected with reproduction can only be verified on the spot.

The endemic arboreous genus *Cuminia* of the Labiatæ has dimorphic, functionally unisexual flowers, intermixed in the same inflorescence, the males largely predominating. It is very closely allied to *Bystropogon*, a genus of upwards of a dozen mostly shrubby species, and some of considerable size, inhabiting the Canary Islands and Western South America. Describing the size of the trunks of several of the Juan Fernandez trees, including the species of *Cuminia*, Philippi states[1] that they are often one to three feet in diameter; but, judging from what Bertero and others say of the size of the species of *Cuminia*, a foot would be the outside diameter of the trunk of any of them. Arboreous Labiatæ are very rare; probably the largest are some South American species of *Hyptis*. A Brazilian species, *Hyptis membranacea*, is stated by Gardner to be a tree thirty to forty feet high; another species, *Hyptis arborea*, a native of British Guiana, New Granada, and Ecuador, grows from twenty to thirty feet high. There are also several large shrubby or subarboreous Labiatæ in India, as *Colebrookia*, *Elsholtzia*, and *Meriandra*.

The shrubby Boraginaceous plant, which we have removed from *Cynoglossum* and raised to the rank of a distinct genus, under the name *Selkirkia*, is allied to the Chatham Island monotypic *Myosotidium* in structure, but very different in habit.

Of all the endemic plants, however, the genus *Lactoris* is the most distinct, being so unique in its structure that its place in the natural system is not easily determined. Philippi referred it to the Magnoliaceæ; but Bentham and Hooker have no doubt correctly placed it in the tribe Saurureæ of the Piperaceæ, though it differs from all the other genera in the flowers having a distinct perianth, and in being solitary or two or three together, instead of being naked and closely packed in racemes or spikes. Associated with these anomalous structural characters, it has the knotted branches and the aromatic taste and smell of a *Piper*.

The structure of the flowers and fruit of the endemic palm *Juania australis* is still very imperfectly known; male flowers have not been described, nor has the fruit. It is to be hoped that no opportunity of obtaining complete specimens will be lost.

Among other endemic plants, *Eryngium bupleuroides* has analogues in the South European *Bupleurum fruticosum*, and in the African genera *Heteromorpha* and *Steganotænia*. There are shrubby species of *Plantago* in South America, but *Plantago princeps* of the Sandwich Islands comes nearest *Plantago fernandezia*.

Another feature in the flora of Juan Fernandez is the almost total absence of Leguminosæ; this it shares in common with New Zealand as well as many of the oceanic islands

[1] *Botanische Zeitung*, 1856, p. 634.

dealt with in this work. Although Orchids are either absent or very rare in all oceanic islands, their total absence from Juan Fernandez is remarkable, because there are several in the Falklands, which are nearly as far from the mainland; and in the islands lying near New Zealand (Lord Auckland, Campbell, and Chatham Islands) there is nearly as large a proportion as in the main island. Coniferæ, too, are wholly absent, as in the Auckland, Campbell, and other islands near New Zealand, as well as in all of the islands coming within the scope of this work, from Fernando Noronha to Amsterdam and St Paul Islands.

In addition to the collections of Juan Fernandez plants mentioned at p. 2, a small one has recently been presented to the Kew Herbarium by Messrs Veitch, nurserymen, of King's Road, Chelsea. This collection was made by Mr. Downton, who travelled for the firm named, and whose special mission was the introduction of living plants of an ornamental character. It comprises between thirty and forty species, including one, *Convolvulus tuguriorum*, not in any of the other collections. They were partly from Juan Fernandez and partly from Masafuera. We have also seen living plants of *Dendroseris macrophylla*, *Wahlenbergia tuberosa* (of which only the foliage was known before), and *Libertia formosa*, introduced by Mr Downton from Masafuera.

In conclusion, we have one more source of information to record. It is the book entitled Crusoniana, or Truth versus Fiction, elucidated in a History of the Islands of Juan Fernandez by the retired Governor of that Colony, a copy of which was purchased for the Kew Library while these sheets were undergoing revision. The author of this remarkable book, which was published in 1843, was Thomas Sutcliffe, an Englishman, who was Governor for a time during the period Juan Fernandez was used by the Chilian Government as a penal settlement. Besides the author's personal knowledge, it contains a condensed history of the island from various sources, commencing with an account of Alexander Selkirk's sojourn there. We have extracted two or three interesting notes on the vegetation.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—ANGIOSPERMÆ.

DICOTYLEDONES.—POLYPETALÆ.

MAGNOLIACEÆ.

Drimys confertifolia, Philippi.

Drimys confertifolia, Philippi in Bot. Zeit., 1856, p. 641.
Drimys chilensis, Gay, Fl. Chil., i. p. 61, partim.
Drimys fernandeziana, Miers in Ann. Nat. Hist., 1858, ser. 3, ii. p. 48, et Contrib. Bot., i. p. 137, t. 27.

Juan Fernandez.—Endemic. One of the commonest trees of the woods on the hills and mountains—*Bertero;* without remarks—*Germain; Cuming; Reed;* here and there —*Moseley.*

Until recently this tree, in books at least, has been associated with the sufficiently distinct *Drimys chilensis;* yet Bertero, who made the earliest considerable collection of plants in the island that has been used for the purposes of this report, recognised it as different from the Continental species. The label accompanying his specimens in the Kew Herbarium bears the following inscription—"*Drimys a chilensi, DC. diversa. Vulgo Canelo. In sylv. coll. et mont.*"

Drimys comprises about ten or a dozen species, whereof one or two are American, ranging from Chili to Brazil and Mexico; one inhabits New Zealand, two Australia, four or five New Caledonia, and one the mountains of Borneo. As a genus it is very distinct, and it affords an example of those southern generic types which are neither peculiarly American nor Old World; and besides being represented in South America and Australasia, extend considerably northward in both hemispheres.

BERBERIDEÆ.

Berberis paniculata, Philippi.

Berberis paniculata, Philippi in Descr. Nuevas Plantas, 1872, p. 6.

Juan Fernandez.—Endemic. A single shrub found—*Philippi.*

Philippi states that this is easily distinguished from *Berberis corymbosa* by its coriaceous, narrower, reticulated leaves, glaucous below, by the shorter petiole, the leafy peduncles, &c.

Berberis corymbosa, Hook. et Arn.

Berberis corymbosa, Hook. et Arn. in Hook. Bot. Misc., iii. p. 135; Gay, Fl. Chil., i. p. 82; Philippi in Bot. Zeit., 1856, p. 627.

Juan Fernandez.—Endemic—*Douglas; Mrs M. Graham; Cuming*, 1338; *Reed; Moseley.*

Apparently common in the island, as it is in all collections. The genus *Berberis* is numerous in species, which are spread all round the northern hemisphere, and in America from Canada to Fuegia, chiefly in the great mountain chain; but none is found south of the equator in the Old World. One species occurs in Africa as far south as Abyssinia. Gay enumerates upwards of twenty species in his Flora Chilena, many of which are very distinct. The insular species exhibit no marked characteristics, and are not very different from some of the continental ones.

CRUCIFERÆ.

Cardamine chenopodifolia, Pers.

Cardamine chenopodifolia, Pers., Synop. Pl., ii. p. 195; DC. Prodr., i. p. 149; St Hil., Fl. Bras. Merid., ii. p. 121, t. 106.
Heterocarpus fernandezianus, Philippi in Bot. Zeit., 1856, p. 641.

Juan Fernandez. *Germain; Reed.*

Also a native of Uruguay, in the neighbourhood of Monte Video, and other parts, and of Entre Rios, growing even in salt water, according to Gibert, who collected it at Punta Brava.

This is one of those remarkable *amphicarpic* plants, belonging to various natural orders, which produce two kinds of seed-vessel; hence Philippi's name. Besides the ordinary linear pod of the genus, containing numerous seeds and borne on the erect stems, *Cardamine chenopodifolia* usually has a number of others at the base of the stem of totally different shape and consistence, each containing one, or sometimes two seeds, which are larger than those in the normal pods. There are no specimens in the Kew Herbarium bearing flowers at the base of the stem, but it is probable that here, as in other plants exhibiting this singular provision, the short, thick-pointed seed-vessels proceed from cleistogamic flowers. The plant is of annual duration, or, to be more explicit, flowers only once, and, as described, buries some of its own seed, thus ensuring its existence. The Chilian *Cardamine cordata*, Gay, is near, but different from this species, which does not appear to have been found on the western side of the continent.

The late Dr A. Grisebach, of Göttingen, had an opportunity of studying the develop-

ment of this interesting plant under cultivation, the results of which were published,[1] and are here repeated in a condensed form. Seeds were sent to the Göttingen Botanic Garden from the Argentine province of Entre Rios, and both kinds were equally fertile, though the young plants from the seeds of underground pods grew more vigorously from the first than the others did. Nevertheless, by the time the plants reached the flowering stage this difference had disappeared. The underground pods contain one,[2] or, at most, two relatively large seeds; while in the normal aërial pods, the seeds are numerous and small. Probably the greater vigour of the plants from the seeds ripened underground was due to the greater amount of nourishment they abstracted from the mother plant. Briefly, a plant of *Cardamine chenopodifolia* may be described as similar to a plant of the common *Cardamine pratensis*, but it has entire leaves; and from the axils of the rosette of leaves at the base of the stem spring the peduncles of the flowers which ripen their seeds underground. These bear each one terminal flower, produced at the same time as the ordinary erect inflorescence. Almost as soon as they are visible, they begin to curve downward, and before the flowering period they have thrust themselves into the ground to the average depth of four-fifths of an inch. The flowers are so small as to be almost imperceptible to the naked eye, for they only attain a length of a millimetre (about one twenty-fifth of an inch), with a diameter of a thirty-second part of an inch, looking more like the blunt end of a peduncle, especially as they remain closed. But the normal flowers are also very small, having petals only about one-sixth of an inch long. Whereas, however, these exhibit the ordinary Cruciferous structure, the underground ones consist of only four green sepals, with four stamens apparently opposite to them, and a pale pistil. The latter contains one pendulous anatropal ovule in each cell. Exceptionally a peduncle is unable to penetrate the ground, and then the pod lies flat on the ground, and is green instead of being blanched. The process of fertilisation of the underground flowers, which was investigated by Dr Drude, proved far more remarkable than the abnormal structure of the flowers. The accuracy of the observations Dr Grisebach was able to confirm by an examination of Dr Drude's microscopic preparations. It appears that each cell of the anther contains only about twelve pollen grains of globular shape, with tetrahedrously-arranged pores and a thin warty extine. The anther cells do not dehisce, but the pollen tubes grow out and pierce the wall, and at once enter the contiguous stigma. In the ovary, the pollen tubes could be traced into the micropyle of the ovule, which was already impregnated, though the pollen tubes remained visible. A comparison of the individual pollen grains of the underground flowers with pollen grains of the aërial flowers revealed

[1] Der Dimorphismus der Fortpflanzungsorgane von Cardamine chenopodifolia, Pers.—*Nachrichten von der Königlichen Gesellschaft der Wissenschaften und der G. A. Universität zu Göttingen*, Juni 1878, p. 332; reprinted in the *Botanische Zeitung*, 1878, pp. 723 and 794.

[2] The ovary of the flowers that bury themselves appears to be invariably two-celled, with one ovule in each cell; and Grisebach states that, contrary to St Hilaire's account, both ovules were fertilised in the cultivated plant, but in all the wild specimens we examined, except one, only one seed was developed.—W. B. H.

the same structure in both, with the noteworthy physiological difference that the latter exuded a viscous substance by which they clung together in clusters. This provision, as we learn from Kerner's admirable observations, is only made where cross fertilisation is effected by insects, being unknown in anemophilous flowers. So it may be assumed that there is cross fertilisation of the expanded flowers of different plants, and it is known from actual observation that self-fertilisation takes place in the underground closed flowers. The cultivated plants produced underground fruits, which were as large as those represented in St Hilaire's figure, but Dr Grisebach does not state whether another generation was raised from the seed.

With regard to the purpose of these underground seeds, Dr Grisebach hints that it may be to ensure the reproduction of the plant in a locality where the prolonged droughts might otherwise jeopardise its existence. *Cardamine chenopodifolia* is a monocarpic, or what is more commonly called an annual plant, and the buried seeds would retain their vitality long after the parent had perished and the seed produced above ground had been dispersed or destroyed; and then when the rains returned the buried seeds would germinate. But this explanation is hardly sufficient, if we take into account the natural habitat of the plant. St Hilaire says: "Nascitur in pascuis maritimis;" and on Gibert's label in the Kew Herbarium, as already mentioned, there is the memorandum: "Croit jusque dans l'eau salée." Therefore it would seem more probable that the purpose is to prevent the seed being carried away by the water. We find another provision for this purpose in many of the Mangroves (*Rhizophora* spp. &c.), the seeds of which germinate while still in the seed-vessel attached to the parent plant; and the thick, heavy radicle goes on elongating until its combined weight and length bring it down to the mud, in which it soon takes a hold, and the plumule begins to grow, and the connection with the parent is severed. On the other hand, many other plants exhibit the same phenomenon, and some of them grow in quite dry localities; so it is not safe to generalise as to the advantages enjoyed by them therefrom. In fact, it is a subject awaiting thorough investigation, for doubtless some plants have retained the faculty after they have ceased to derive any benefit from it. Seeds thus sunk in the earth are not only protected from drought or water, as the case may be, but also from birds and many graminivorous animals that do not burrow.[1]

Cardamine flaccida, Ch. et Schl.

Cardamine flaccida, Ch. et Schl. in Linnæa, i. p. 21.
Cardamine bonariensis, Pers., Synopsis Pl, ii. p. 195; DC., Prodr., i. p. 150.

JUAN FERNANDEZ. *Douglas; Moseley.*

There is some doubt whether the Juan Fernandez plant be really *Cardamine flaccida*, inasmuch as it is to us uncertain whether that is a distinct species or merely a form of

[1] For further particulars on this subject see Dyer in *Nature*, xvii., 1878, p. 446.

the widely-spread and variable *Cardamine hirsuta*. The former was founded on a Chilian plant collected at Talcagua, and is not different from plants named *Cardamine nasturtioides* in the Kew Herbarium. In a broad sense a number of the South American forms of *Cardamine* belong to *Cardamine hirsuta*, which is also represented in Australia and New Zealand by at least an equal series of varieties. The Tristan da Cunha *Cardamine propinqua* of Carmichael (Trans. Linn. Soc. Lond., xii. p. 507) would appear to be the same as *Cardamine flaccida*, for since writing the account of the botany of the Tristan group, we have seen a specimen of a *Cardamine* raised by Mr Mitten from seed in the earth attached to some of the mosses brought home by Mr Moseley, which is exactly like the *Cardamine* collected in Juan Fernandez by Douglas and Moseley. Of course, there is just the possibility of an error in the origin of Mr Mitten's plant, which he sent to Kew with the following note :—"I shook out all the dust from the Tristan da Cunha mosses, and have raised therefrom a *Cardamine* very like the Azoric *Cardamine caldeirarum*." The last named is a critical species of the *Cardamine hirsuta* type, and said to be most nearly allied to *Cardamine sylvatica*, which in its turn is at most a sylvan subspecies of *Cardamine hirsuta*. Carmichael compares his plant with *Cardamine antiscorbutica*, Banks, which is reduced in Hooker's Flora Antarctica to *Cardamine hirsuta*, as is also *Cardamine propinqua*. Whatever rank be assigned to these southern forms of *Cardamine*, the presence of one in the Tristan da Cunha group merely counts as an additional species of a type common to the American and Australasian regions.

BIXINEÆ.

Azara fernandeziana, Gay.

Azara fernandeziana, Gay, Fl. Chil., i. p. 196 ; Philippi in Bot. Zeit., 1856, p. 627.

Juan Fernandez.—Endemic. In woods on the higher mountains—*Bertero*, 1436 ; without locality—*Reed*.

Allied to the common Chilian *Azara serrata*, Ruiz and Pavon, and apparently rare. Excluding a doubtful West Indian plant, and another Mexican one, *Azara* is restricted to Chili, and consists of about a dozen species.

CARYOPHYLLEÆ.

Stellaria cuspidata, Willd.

Stellaria cuspidata, Willd. ; DC., Prodr., i. p. 396 ; Gay, Fl. Chil., i. p. 264.

Juan Fernandez.—In moist woods of the higher mountains—*Bertero ; Reed ; Moseley*.

Common in Western America from Mexico to Chili. This is very near to, if not the same as, the European *Stellaria nemorum*.

Sagina chilensis, Gay.

Sagina chilensis, Gay, Fl. Chil., i. p. 282; Philippi in Bot. Zeit., 1856, p. 628 (*Sagina chilensis*, Naud.)

JUAN FERNANDEZ.

Common in the central provinces of Chili, according to Philippi, on whose authority alone it is recorded from Juan Fernandez.

Spergularia rubra, Presl.

Spergularia rubra, Presl.; Benth., Fl. Austral., i. p. 161.
Arenaria rubra, Linn., Sp. Pl., ed. i. p. 423; var. *polyphylla*, Philippi in Bot. Zeit., 1856, p. 642.
Spergularia polyphylla, Rohrb. in Linnæa, xxxvii. p. 232 (species).

JUAN FERNANDEZ; MASAFUERA.—Common, and in all collections from Bertero's time to the present.

Widely spread in temperate regions, both north and south, though perhaps originally introduced into the southern hemisphere. Rohrbach designates the Juan Fernandez plant as "Species ab omnibus seminum testa structura distinctissima. Tuberculi enim omnibus ceteris speciebus semper sunt multo longiores quam latiores, forma cylindrica, ad apicem versus dilatata. . . . In nostra autem specie tuberculi sunt humiles, sed ad axin unam valde dilatate, quasi vermiformes et sæpe paullum curvati."

PORTULACEÆ.

Monocosmia corrigioloides, Fenzl.

Monocosmia corrigioloides, Fenzl. in Ann. Wien Mus., ii. p. 297; Gay, Fl. Chil., ii. p. 477; Philippi in Bot. Zeit., 1856, p. 628.
Talinum monandrum, Ruiz et Pav., Prodr. Fl. Peruv., p. 65.
Calandrinia monandra, DC., Prodr., iii. p. 359.
Corrigiola deltoidea, Hook. et Arn., Bot. Beech. Voy., p. 24.

JUAN FERNANDEZ, ex *Philippi*.

Not uncommon in the central and southern provinces of Chili, whence it may have been introduced into the island. An annual herb, in none of the Juan Fernandez collections consulted. The only species of the genus.

GERANIACEÆ.

Oxalis laxa, Hook. et Arn.

Oxalis laxa, Hook. et Arn., Bot. Beech. Voy., p. 13; Gay, Fl. Chil., i. p. 447; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ. *Germain; Reed; Moseley.*

One of the commonest and most widely spread species in Chili. The insular form is a small one, with smaller flowers than the ordinary continental one.

RUTACEÆ.

Zanthoxylum mayu, Bertero.

Zanthoxylum mayu, Bertero in Ann. Sc. Nat., xxi. p. 345, *nomen tantum;* Hook. et Arn. in Hook. Bot. Miscel., iii. p. 168; Colla in Mem. Accad. Sc. Torino, xxxvii. p. 51, t. 5; Gay, Fl. Chil., i. p. 483; Philippi in Bot. Zeit., 1856, p. 634.

Juan Fernandez.—Endemic. In the mountain woods—*Bertero;* without locality—*Cuming*, 1340; *Germain; Reed; Moseley.*

"Arbor procera, vulgo mayu."—*Bertero.*

Not strikingly different from the South American species.

"This is the largest tree in the island, and the present inhabitants call it 'Naranjillo,' and not *Mayu*, and in the narrative of Lord Anson's voyage it bears the name *Myrta*. The trunk sometimes attains as much as six feet in diameter, and in Lord Anson's time planks of it thirty feet long were sawn out."—*Philippi.*

RHAMNACEÆ.

Colletia spartioides, Bertero.

Colletia spartioides, Bertero in Ann. Sc. Nat., xxi. p. 347, *nomen tantum;* Colla in Mem. Accad. Sc. Torino, xxxvii. p. 52, t. 6; Gay, Fl. Chil., ii. p. 34; Hook., Bot. Miscel., iii. p. 173.

Juan Fernandez.—Endemic. In the higher mountain woods—*Bertero.*

This is described by Bertero as a tree six to ten feet high; it is in none of the later collections at Kew. *Colletia* is an exclusively South American, chiefly Chilian genus; but the closely allied, otherwise South American, *Discaria*, is represented in Australia and New Zealand by one species. *Colletia spartioides* differs from the other species in its arboreous character.

LEGUMINOSÆ.

Sophora tetraptera, Ait.

Sophora tetraptera, Ait.; Hook. f., Handb. Fl. N. Zeal., p. 52 (*varietates plures*); Bot. Mag., t. 167.
Sophora microphylla, Jacq., Hort. Schœnb., t. 269.
Edwardsia microphylla, Salisb. in Trans. Linn. Soc. Lond., ix., p. 299; Bot. Mag., t. 1442; Gay, Fl. Chil., ii. p. 216.
Edwardsia macnabiana, Grah. in Bot. Mag., t. 3735.
Edwardsia fernandeziana, Philippi in Bot. Zeit., 1856, p. 642, et 1873, p. 742.
Edwardsia reedeana, Philippi in Bot. Zeit., 1873, p. 742.
Edwardsia masafuerana, Philippi in Bot. Zeit., 1873, p. 743.

Juan Fernandez; Masafuera. *Bertero; Reed.*

In the sense here given this species inhabits South America, Easter Island, and New Zealand, being exceedingly common and variable in both regions, and exhibiting the same kind of variation in its most distant habitats. Philippi regards the forms as distinct

species, two of them, *Edwardsia fernandeziana* and *Edwardsia reedeana*, being peculiar to Juan Fernandez, and *Edwardsia masafuerana* to Masafuera. He further describes the Easter Island form as an independent species, which he calls *Edwardsia toromiro*, and another Chilian form he raises to the same rank under the name *Edwardsia cassioides*. Whether species or varieties, the genetic connection of all the forms is very close. "Guyacan" is the name applied to *Sophora tetraptera* in Juan Fernandez.

ROSACEÆ.

Fragaria chilensis, Ehrh.

Fragaria chilensis, Ehrh.; DC., Prodr., ii. p. 571; Gay, Fl. Chil., ii. p. 305; Bertero in Ann. Sc. Nat., xxi. p. 350.

JUAN FERNANDEZ.—Common—*Bertero; Reed; Moseley.*

Common in Chili, and in North America from Alaska to San Francisco; also in the Sandwich Islands.

Watson (Botany of California, i. p. 177) states that the North American plant is identical with the Chilian. In the Sandwich Islands it grows high up in the mountains.

Margyricarpus setosus, Ruiz et Pavon

Margyricarpus setosus, Ruiz et Pavon, Fl. Peruv. et Chil., i. p. 28, t. 8; Gay, Fl. Chil., ii. p. 279; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ.—Barren pastures—*Bertero; Cuming*, 1327; *Moseley.*

Patagonia, through the Andes to New Grenada, and on the eastern side northward to South Brazil.

There are two other species of the genus, one Chilian and the other Peruvian.

Acæna argentea, Ruiz et Pavon.

Acæna argentea, Ruiz et Pavon, Fl. Peruv. et Chil., i. p. 67, t. 103; DC., Prodr., ii. p. 593; Gay, Fl. Chil., ii. p. 294.

JUAN FERNANDEZ. *Reed; Moseley.*

A Chilian plant, not represented in any of the earlier collections from Juan Fernandez, where it may be of recent introduction. The glochidiate prickles of the fruit cling readily to foreign objects, and the seeds are thus often carried long distances.

SAXIFRAGEÆ.

Escallonia callcottiæ, Hook. et Arn.

Escallonia callcottiæ, Hook. et Arn. in Hook., Bot. Misc., iii. p. 342 (1833); Gay, Fl. Chil., iii. p. 58; Engler in Linnæa, xxxvi. p. 549.

Escallonia rubricaulis, Colla in Mem. Accad. Sc. Torino, xxxvii. p. 79 (1834); Rémy in Gay Fl. Chil., iii. p. 57; Engler in Linnæa, xxxvi. p. 578.

Escallonia fernandeziana, Philippi in Bot. Zeit., 1856, p. 644.

Juan Fernandez.—Endemic. Thickets and open woods—*Bertero; Scouler; Douglas; Reed; Moseley.*

There appears to be but one species in the islands, but it varies very much in stature and in foliage, according to the situation in which it grows. Rémy (l. c.) states that Colla records his *Escallonia rubricaulis* from the central provinces of Chili, and Engler repeats it; yet Colla cites only the following remark: "Hab. in fruticetis et sylvaticis apricis collium insulæ Juan Fernandez," which is almost an exact copy of Bertero's label in the Kew Herbarium.

Escallonia numbers between forty and fifty species, restricted to South America, and finds its greatest concentration in Chili.

HALORAGEÆ.

Haloragis alata, Jacq.

Haloragis alata, Jacq., Ic. Pl. Rar., i. t. 69; Hook. f., Handb. Fl. N. Zeal., p. 65; Benth., Fl. Austr., ii. p. 479.
Haloragis cercodia, Ait., Hort. Kew, ed. 1, ii. p. 37; Gay, Fl. Chil., ii. p. 362.
Cercodia erecta, Murr.; DC., Prodr., iii. p. 67.

Juan Fernandez.—Amongst grass and bushes on the hills—*Bertero,* 1464; without locality—*Scouler; Cuming,* 1347; *Mrs Graham; Reed; Moseley.*

Also in New Zealand, New South Wales, and Victoria, but not on the mainland of South America, where the genus is unrepresented. *Haloragis* numbers about forty-two species, thirty-seven of which inhabit Australia, where thirty-three of them are endemic. Four species, one of which is peculiar, occur in New Zealand; one species is found in New Caledonia, and two or three species in the Indian Archipelago, while *Haloragis micrantha* ranges from New Zealand and Australia northward to India, China, and Japan. It is by mistake that Mr Bentham (Flora Australiensis, ii. p. 473) records the genus as South African.

Gunnera insularis, Philippi.

Gunnera insularis, Philippi in Bot. Zeit., 1856, p. 642.

Juan Fernandez.—Endemic (ex *Philippi*).

There are no specimens at Kew answering to the description of this species, which the author states is allied to *Gunnera magellanica,* "differt foliis haud crenatis, sed obscure lobatis, dentibus distantibus munitis, nec non statura multo majore."

Gunnera bracteata, Steud. (Plate LIV.)

Gunnera bracteata, Steud., fide R. Br. in Benn. Pl. Jav. Rar., p. 75; Walp., Rep., ii. p. 100.
Gunnera glabra, Philippi in Bot. Zeit., 1856, p. 643?

Juan Fernandez.—Endemic. Damp, shady places in the higher mountains—*Bertero,* 1463, at least in part; *Germain.*

There is a little uncertainty about this species, arising from the fact that Bertero regarded the insular forms as belonging to *Gunnera chilensis*, Lam. (*Gunnera scabra*, Ruiz et Pavon), and consequently distributed two species under the same number. A specimen in Kew Herbarium without a number labelled "Juan Fernandez, Bertero," in the handwriting of the late Sir William Hooker, agrees with Brown's brief description; but a female inflorescence and a seedling plant about eight inches high can hardly belong to the same species. Bertero's label, bearing the number 1463, is attached to the same sheet, and most likely the specimen figured for this work was sent with the latter as one species, for Bertero (Annales des Sciences Naturelles, xxi. p. 348) says: "La tige du *Gunnera scabra* acquiert dans ce lieu jusqu'à 10 pieds de haut; ses feuilles varient considerablement: j'en ai vu de peltées, de très-glabres, lisses, et même luisantes." Bertero named his specimens *Gunnera scabra*, var. *foliis lævibus*. Philippi describes the inflorescence of his *Gunnera glabra* thus: "Spica fœminea composita, rhachidibus partialibus filiformibus. Flores masculi in pedunculi aderant; an spica semper aut casu tantum androgyna?" Yet his description of the leaf does quite well for *Gunnera bracteata*. The stem, he states, is six feet high. Bertero cites the name "pangue," which belongs to the continental *Gunnera chilensis*, for the insular plant.

Gunnera peltata, Philippi.

Gunnera peltata, Philippi in Bot. Zeit., 1856, p. 642.

Juan Fernandez. — Endemic. Without locality — *Germain; Reed; Scouler? Moseley?*

The specimens in Kew Herbarium are too imperfect for satisfactory determination, the base of the blade of the leaf being wanting in all cases. There is no doubt that the genuine *Gunnera peltata* is quite distinct from *Gunnera chilensis*, as it has a trunk from twelve to eighteen feet high and distinctly peltate leaves. Among the specimens of *Gunnera* in the Kew Herbarium is one sheet ticketed "Juan Fernandez, Douglas," which seems to be the typical *Gunnera chilensis;* the inflorescence and leaf corresponding exactly to Chilian specimens.

The genus *Gunnera* comprises about fifteen species inhabiting America, from Fuegia and the Falkland Islands to Mexico, Abyssinia, Java, Tasmania, New Zealand, and the Sandwich Islands.

MYRTACEÆ.

Myrtus fernandeziana, Hook. et Arn.

Myrtus fernandezianus, Hook. et Arn. in Hook. Bot. Misc., iii. p. 316; Berg in Linnæa, xxvii. p. 40.
Eugenia fernandeziana, Barneoud in Gay Fl. Chil., ii. p. 392.
Eugenia lumilla, Philippi in Bot. Zeit., 1856, p. 643.

Juan Fernandez.—Endemic. In mountain woods—*Bertero*, 1484; without locality—*Moseley.*

The specimens collected by Mr Moseley prove that Philippi's *Eugenia lumilla* is not different from the older *Myrtus fernandezianus*. Scouler and Douglas's specimens, quoted by Hooker and Arnott, do not exist at Kew. Philippi relies upon the description in Gay (Flora Chilena, ii. p. 392), "Arbolillo de varios piés de alto" for one of his differences; but Bertero states (Annales des Sciences Naturelles, xxi. p. 345) that the Luma or Temu was one of the commonest trees, sometimes attaining a prodigious size.

Myrtus selkirkii, Hemsl.

Myrtus selkirkii, Hemsl.
Eugenia selkirkii, Hook. et Arn. in Hook. Bot. Misc., iii. p. 318; Gay, Fl. Chil., ii. p. 392.
Ugni? selkirkii, Berg in Linnæa, xxvii. p. 392.
Myrtus berteroi, Philippi in Bot. Zeit., 1856, p. 644 (*ex descriptione*).
Myrtus ugni, Bertero in Ann. Sc. Nat., xxi. p. 347, non Molina.

Juan Fernandez.—Endemic. In thickets on the highest peaks—*Bertero*, 1480.

We have only seen Bertero's specimen in the Kew Herbarium. The genus is represented by many species in Chili, some of them closely allied to the insular forms; and there are three species in New Zealand.

FICOIDEÆ.

Tetragonia expansa, Murr.

Tetragonia expansa, Murr.; DC., Prodr., iii. p. 452; Gay, Fl. Chil., ii. p. 468; Bertero in Ann. Sc. Nat., xxi. p. 346; Benth., Fl. Austr., iii. p. 325; Hook. f., Hand. Fl. N. Zeal., p. 84.

Juan Fernandez. *Reed.*

Bertero (l. c.) mentions this as an example of a New Zealand plant occurring in Juan Fernandez, but it is probably merely a colonist in the island, as well as in Chili, for Gay's only record is "the neighbourhood of Valparaiso, where Bertero met with it."

UMBELLIFERÆ.

Eryngium bupleuroides, Hook. et Arn.

Eryngium bupleuroides, Hook. et Arn. in Hook. Bot. Misc., iii. p. 352; Gay, Fl. Chil., iii. p. 118; Philippi in Bot. Zeit., 1856, p. 628.
Lessonia, Bertero in Ann. Sc. Nat., xxi. p. 348.

Juan Fernandez.—Endemic. In woody, stony, elevated situations—*Bertero*, 1471; *Mrs Graham; Reed; Moseley.*

This and *Eryngium sarcophyllum* are very distinct species of this widely diffused genus, which is strongly represented in South America.

Eryngium sarcophyllum, Hook. et Arn.

Eryngium sarcophyllum, Hook. et Arn. in Hook. Bot. Misc., iii. p. 352; Gay, Fl. Chil., iii. p. 117.

MASAFUERA.—Endemic. Without any memorandum—*Cuming*, 1355.

We have only seen the one specimen upon which the species was founded.

Sanicula liberta, Ch. et Schl.

Sanicula liberta, Ch. et Schl. in Linnæa, i. p. 253; DC., Prodr., iv. p. 84; Gay, Fl. Chil., iii. p. 109.
Sanicula crassicaulis, Pœppig; DC., Prodr., iv. p. 84.

JUAN FERNANDEZ. *Reed; Moseley.*

A native of Peru and Chili, not in any of the earlier collections from the island, and probably of recent introduction there. We have not seen ripe fruit of this species, but in most of them it is furnished with barbed prickles, and thereby readily conveyed from place to place.

Daucus australis, Pœppig.

Daucus australis, Pœppig in DC., Prodr., iv. p. 214; Gay, Fl. Chil., iii. p. 136; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ (ex *Philippi*).

Common in Chili, and perhaps of recent introduction in the island, as it does not occur in the early collections.

GAMOPETALÆ.

RUBIACEÆ.

Coprosma triflora, Benth. et Hook.

Coprosma triflora, Benth. et Hook., Gen. Plant., ii. p. 139.
Psychotria hookeri, Don, Gen. Syst. Gard., iii. p. 585; Gay, Fl. Chil., iii. p. 198.
Psychotria triflora, Hook. et Arn. in Hook. Bot. Misc., iii. p. 359, non Schum.
Hippotis triflora, Bertero in Ann. Sc. Nat., xxi. p. 347, non Ruiz et Pavon.

JUAN FERNANDEZ.—Endemic. Very common—*Bertero*, 1466; *Cuming*, 1337; *Reed; Moseley.*

The genus *Coprosma* comprises between thirty and forty species, mostly inhabiting New Zealand and the Sandwich Islands, and a few Oceania and Australia.

Psychotria pyrifolia, Hook. et Arn.

Psychotria pyrifolia, Hook. et Arn. in Hook. Bot. Misc., iii. p. 360; Gay, Fl. Chil., iii. p. 199.

JUAN FERNANDEZ.—In the more elevated mountain woods—*Bertero.* MASAFUERA. *Reed.*

"Peralillo" of the inhabitants of Juan Fernandez, according to Bertero.

COMPOSITÆ.

Erigeron fruticosus, DC.

Erigeron fruticosus, DC., Prodr., v. p. 283; Gay, Fl. Chil., iv. p. 22.
Terranea fernandezia, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 11, t. 23.
Aster erigeroides, Hook. et Arn. in Hook. Comp. Bot. Mag., ii. p. 48, cum *β prolifero*.

JUAN FERNANDEZ. — Woods in the higher mountains — *Bertero;* rocky plain— *Douglas; Cuming*, 1334; *Moseley; Reed; Downton.* MASAFUERA.—*Reed*, collected in 1872.

This species, which is apparently confined to these islands, bears a strong resemblance to the endemic Bermudan *Erigeron darrellianus.*

Erigeron rupicolus, Philippi.

Erigeron rupicolus, Philippi in Bot. Zeit., 1856, p. 644.

MASAFUERA (ex *Philippi*).

We have seen no specimen of this species, which is described as a dwarf, glabrous, suffruticose plant having crowded spathulate leaves on long petioles, and small flower-heads with white rays.

Micropsis nana, DC.

Micropsis nana, DC., Prodr., v. p. 460; Philippi in Bot. Zeit, 1856, p. 629; Gay, Fl. Chil., iv. p. 108.

JUAN FERNANDEZ (ex *Philippi*).

An annual herb, from one to three inches high, otherwise peculiar to Chili, and probably of recent introduction into the island, for it does not exist in any of the collections consulted for this report.

Gnaphalium cheiranthifolium, Lam.

Gnaphalium cheiranthifolium, Lam., Encycl., ii. p. 752; DC., Prodr., vi. p. 223; Baker in Mart. Fl. Bras., fasc. lxxxvii. p. 122 (*varietates plures*).
Gnaphalium paniculatum, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 17, t. 26.
Gnaphalium citrinum, Hook. et Arn. in Bot. Beech. Voy., p. 31; DC., Prodr., vi. p. 223; Gay, Fl. Chil., iv. p. 222.

JUAN FERNANDEZ.—In mountain pastures—*Bertero; Scouler.*

Exceedingly common and widely spread in South America.

Gnaphalium insulare, Philippi.

Gnaphalium insulare, Philippi in Bot. Zeit., 1856, p. 645.

MASAFUERA.—Endemic? (ex *Philippi*).

Cuming's 1353 may be this species, but the genus is a difficult one. Many of the species are weeds of cultivation and waste places, and colonise freely in the most unlikely

places, so that the specific distinctness of this and *Gnaphalium fernandezianum*, from all previously described forms, is problematical, and only to be ascertained by studying the whole of the species of this group of the genus.

Gnaphalium fernandezianum, Philippi.

Gnaphalium fernandezianum, Philippi in Bot. Zeit., 1856, p. 646.

Juan Fernandez and Masafuera. *Philippi.*

Specimens collected in Juan Fernandez by Reed and Moseley agree fairly well with the description; but they are named, perhaps correctly, *Gnaphalium berterianum*, DC., a common Chilian species.

[*Gnaphalium decurrens*, Ives, is recorded (Gay, Fl. Chil., iv. p. 224) from Juan Fernandez, probably through an error in naming. It is a North American species, not unlike, though distinct from, *Gnaphalium cheiranthifolium.*]

Galinsoga parviflora, Cav.

Galinsoga parviflora, Cav., Ic. Pl., iii., p. 41, t. 281; DC., Prodr., v. p. 667; Gay, Fl. Chil., iv. p. 267.

Juan Fernandez. *Philippi.*

An annual plant generally diffused in cultivated ground, roadsides, &c., in North and South America, as well as in many parts of the Old World, where, however, it is known to have been originally introduced. It is doubtless a colonist in Juan Fernandez.

Rhetinodendron (Meissn.) berteroi, Hemsl.

Rhetinodendron (Meissn.) *berteroi*, Hemsl.
Balbisia berterii, DC. in Guill. Archives de Bot., ii. p. 333; DC., Prodr., vi. p. 447; Delessert, Ic. Sel., iv. t. 62; Dcne. in Ann. Sc. Nat., sér. 2, i. p. 16, t. 1.
Vendredia berterii, Baill., Histoire des Plantes, Monogr. Comp., pp. 264 et 265.
Ingenhousia thurifera, Bertero MSS. in Herb. Kew.

Juan Fernandez.—Endemic. Shady woods in the higher mountains—*Bertero*, 1407; *Cuming*, 1329; *Reed; Moseley.*

As the name *Balbisia* is retained for a genus of Geraniaceæ, it is only right to restore Meissner's appropriate name[1] *Rhetinodendron* for this genus, for there is no doubt that he had the same plant under consideration which De Candolle described and named *Balbisia berterii*. Meissner founded his genus without giving any specific name or citing the collector of the plant he described. By an oversight *Rhetinodendron* was not taken up in the Genera Plantarum of Bentham and Hooker, though Steudel and Pfeiffer both include it as a synonym of *Balbisia*, DC. Baillon, perceiving that the name *Balbisia* was already occupied, replaced it by *Vendredia*, overlooking the fact of the existence of *Rhetino-*

[1] Genera Plantarum, 1839, p. 216.

dendron. From Bertero's specific name, *thurifera*, this tree is doubtless one of those that yield incense, though he quotes no native name for it on his label, merely recording its height as eight to ten feet. Most likely, however, it is the tree referred to by him (Ann. Sc. Nat., xxi. p. 347) in the following sentence:—"Un arbre assez élevé, et de la tribu des Eupatorinées, me paraît tout-a-fait inconnu; il donne une gomme resine qui a aussi la même odeur que l'encens." The "Resina macho" and the "Resina hembra" mentioned are species of *Robinsonia*. No record is to be found of the relative frequency of *Rhetinodendron*; but as it is in the later collections, it is probably not uncommon. Bertero's specimens in the Kew Herbarium include a seedling plant, about fifteen inches high, the leaves of which are shorter, broader, and very coarsely toothed.

Robinsonia evenia, Philippi.

Robinsonia evenia, Philippi in Bot. Zeit., 1856, p. 644.

Juan Fernandez.—Endemic. *Reed; Moseley; Downton.*

Philippi describes this as a shrub about six feet high. In many of its characters it agrees with Decaisne's *Robinsonia macrocephala*, while in others it is apparently very different. Probably some of these differences are only sexual, and there may be no more than three or four distinct species of *Robinsonia* in the island. The flower-heads are always (?) in all the species (?) unisexual, and, as far as examined, all the flower-heads of a specimen are either male or female; hence it may be assumed that the sexes are borne by different plants. In consequence of this separation of the sexes, it is impossible to limit the species without ample materials, for we cannot tell what other differences the sexes may present. In De Candolle's Prodromus, the bristles of the pappus of *Robinsonia* are described as cohering in a tube nearly half-way up—a condition not found in any of the specimens we have examined. *Robinsonia evenia* differs essentially from the other species in the involucral bracts being free to the base, and it has all the aspect of a true *Senecio*. It may be mentioned that De Candolle named this genus, which is endemic in Juan Fernandez, after Defoe's hero.

Robinsonia gayana, Dcne.

Robinsonia gayana, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 28, t. 1; Delessert, Ic. Sel., iv. t. 64; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 126.
Robinsonia corrugata, Philippi in Bot. Zeit., 1856, p. 645.
Senecio thurifer, var. ? Bertero MSS. in Herb. Kew.

Juan Fernandez.—Endemic. Thickets in stony places of the higher mountains—*Bertero; Douglas; Reed; Moseley.*

This species and *Robinsonia thurifera*, Dcne., are not readily distinguishable. Bertero regarded them broadly as one species, yet he points out differences, and suggests that there

were two confounded. His remarks thereon are here translated: "The 'Resina,' which is highly esteemed in Chili on account of its reputed medicinal properties, is a gum-resin yielded by a small tree which I take to be a *Senecio;* it exudes from the trunk and branches, and by exposure to the air becomes solid and brittle; in burning it gives off an odour like that of incense. They distinguish the 'Resina macho' from the 'Resina hembra.' The latter yields less, and it never hardens so much as that of the former. The produce of the Macho is called 'Resina,' while that of the Hembra is called 'Incensa.' Perhaps two species are here confused, for the leaves of the latter are narrower, and the cymose flower-heads are yellow in the disk and deep red in the rays, whereas those of the former are corymbose and wholly yellow. Another small tree of the same genus, called 'Resinilla,' is a new species, which furnishes no resin."

Robinsonia gayana is the "Resina hembra," or female resin, and is apparently still moderately plentiful in the island.

Robinsonia gracilis, Dcne. (Plate LV.)

Robinsonia gracilis, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 29; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 127.
Robinsonia micrantha, Philippi MSS. in Herb. Kew.
Senecio stenophyllus, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Woods in the higher parts of the mountains—*Bertero; Reed; Downton.*

This is the "Resinilla" mentioned under the last species, of which we had only seen Bertero's specimen, represented in our plate, and two small branchlets collected by Mr Reed in 1872, until the arrival of Downton's collection at Kew, since our drawing was made.

Robinsonia longifolia, Philippi.

Robinsonia longifolia, Philippi in Bot. Zeit., 1856, p. 644.

JUAN FERNANDEZ.—Endemic. *Germain.*

No authentically named specimens of this species have come under our observation, but from the description it is very near to, if not the same as, *Robinsonia thurifera*, Dcne.

Robinsonia macrocephala, Dcne.

Robinsonia macrocephala, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 28, t. 1; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 125.

JUAN FERNANDEZ.—Endemic. On the mountains—*Gay.*

Decaisne states that this species was founded on a single specimen in the Paris Herbarium, presented by Claude Gay, the author of the Flora Chilena. There is nothing answering to the figure and description in the English collections.

Robinsonia, thurifera Dcne.

Robinsonia thurifera, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 28; DC., Prodr., vi. p. 448; Delessert, Ic. Sel., iv. t. 64; Gay, Fl. Chil., iv. p. 127.
Senecio thurifer, Bertero MSS. in Herb. Kew.

Juan Fernandez.—Endemic. In stony thickets of the higher mountains—*Bertero.*

The Resina macho, or male resin of the natives, represented in the herbaria consulted by Bertero's specimen only. As observed under *Robinsonia evenia*, it is impossible with the present material to define the species of this genus or to say how many the specimens represent. Whether the "male" and "female" resins of Bertero's collection are of the same species, as supposed by him, and, in a manner, confirmed by Planchon in Kew Herbarium, is perhaps a little uncertain. Planchon determined Bertero's Kew specimens from Decaisne's descriptions and figures, cited above—both the "Resina macho," and "Resina hembra," as *Robinsonia gayana;* possibly because the Kew Resina macho is not male, as described by De Candolle in the Prodromus. The Kew specimen of the Resina macho is apparently a young female, and quite like that represented in Delessert. All the flowers in all the heads of an excellent specimen are of the same sex; and, judging from the solitary specimen, we should think *Robinsonia thurifera* is distinct from *Robinsonia gayana.* Its Dracænoid leaves are double the size, and the inflorescence is different, as well as the flowers and achenes. Among the specimens we should refer to, *Robinsonia gayana* are both male and female; Bertero's original is wholly female, with perfectly ripe seeds containing fully developed embryos with flat, not convolute, cotyledons.

Dendroseris berteriana, Hook. et Arn.

Dendroseris berteriana, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea berteriana, Dcne. in Guill. Archives Bot., i. p. 515, t. 10, fig. 2; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 464.
Rea pinnata, var. *insignis* (*forte species distincta*), Bertero MSS. in Herb. Kew.

Juan Fernandez.—Endemic. Woods in the higher mountains at a place called El Yunque—*Bertero.*

The genus *Dendroseris*, or *Rea*, as we should prefer calling it, if we might be permitted to disregard the strict rule of priority in this particular case in order to render tribute to the man who first collected its species and made them known to the scientific world, belongs to the suborder Cichoriaceæ, and is restricted to Juan Fernandez and Masafuera. The earliest record of these singular arboreous Compositæ is to be found in Bertero's sketch of the flora of the island (Ann. Sc. Nat., 1830, xxi. p. 348), the substance of which deserves reproducing: "I had forgotten to mention to you one thing which greatly astonished me; it is the existence of five or six species, which, in my humble opinion, should constitute a new genus. They belong to the Cichoriaceæ, and, if I am not mistaken, are near *Sonchus.* Three of them are trees from ten to fifteen feet high,

with trunks in proportion, hard wood, the branches almost always in threes, and the flower-heads in panicles. In one species the flower-heads resemble in size, shape, and colour, those of *Hypochæris helvetica*. By incision they all exude a thick viscous milky juice in enormous quantity. The stems and branches are hollow; the inflorescence paniculate; the leaves, simple and alternate usually, are pinnate in one species. In this the leaflets vary infinitely; sometimes they are linear and simple or bifurcate, sometimes toothed with the terminal lobe cordiform or reniform, like the leaves of *Caltha palustris* or *Asarum europæum*, but much larger. I think this is the finest discovery I have made." From the foregoing there is no doubt what plants he had in view; but, unfortunately, he proposed no name for the genus, though his manuscript name, *Rea*, probably existed even at that date. In 1833, Decaisne published (Guillemin, Archives de Bot., i. p. 513) Bertero's six species of *Rea*, and described a seventh himself—the *Rea berteriana*, which Bertero regarded as possibly a variety of his *pinnata*. A little more than a year earlier, however, Don (Philosophical Magazine, April 1832) founded *Dendroseris*, on a single species, it is true, yet that entitles him to priority, and we somewhat regretfully follow Hooker and Arnott, who in 1835 reduced Bertero and Decaisne's species of *Rea* to the older published genus *Dendroseris*. In spite of these facts, De Candolle revived the name *Rea* three years later in the Prodromus, on the strength of having seen it in manuscript in Bertero's Herbarium in 1830; and Gay follows him in the Flora Chilena.

Of the present species, *Dendroseris berteriana*, we have only seen Bertero's specimen, collected more than fifty years ago, so it must be very rare, or perhaps even extinct, for so conspicuous and distinct a plant could otherwise hardly have been overlooked by all subsequent collectors.

Dendroseris macrophylla, Don.

Dendroseris macrophylla, Don. in Phil. Mag., 1832, p. 388; Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32; Bot. Mag., t. 6353.

Rea macrantha, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 514, t. 9, fig. A., et 10, fig. 1; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 463.

Juan Fernandez.—Shady woods on the higher mountains—*Bertero; Reed; Moseley.*

Masafuera.—*Cuming*, 1350; *Downton.*

Don founded the genus on a specimen of this species, collected by Cuming, about a year before the publication of Bertero's name *Rea*.

Dendroseris marginata, Hook. et Arn.

Dendroseris marginata, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.

Rea marginata, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 519; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 467.

Juan Fernandez.—Endemic. Rocky woods of the higher mountains, at a place called Portezuelo—*Bertero.*

A distinct species, apparently founded upon specimens destitute of both flowers and fruit. Bertero describes it as a small tree three to six feet high. It is so different from everything else from the island as to be unmistakable. Gay was of opinion that it was the same as *Dendroseris macrophylla*, but it is wholly different.

Dendroseris micrantha, Hook. et Arn.

Dendroseris micrantha, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea micrantha, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 518, t. 9, et t. 10, fig. D.; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 467.

Juan Fernandez.—Endemic. Shady woods in the higher mountains—*Bertero.*

Another very distinct species, which is wanting in all recent collections. It was one of the taller species collected by Bertero, growing ten to fifteen feet high, and bearing enormous terminal panicles of very small flower-heads.

Dendroseris mollis, Hook. et Arn.

Dendroseris mollis, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea mollis, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 519; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 468.

Juan Fernandez.—Endemic. Stony woods in the higher mountains, at a place called Portezuelo—*Bertero.*

Like *Dendroseris marginata*, from the same locality, this species was founded on specimens without flower-heads, and it is not in the Kew set of Bertero's plants.

Dendroseris neriifolia, Hook. et Arn.

Dendroseris neriifolia, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea neriifolia, Dcne. in Guill. Archives Bot., i. p. 517; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 466.
Rea leucantha, Bertero MSS. in Herb. Kew.

Juan Fernandez.—Endemic. In the valley of Pangal—*Bertero.*

Perfectly distinct from all other species, yet not met with in any recent collections.

Dendroseris pinnata, Hook. et Arn.

Dendroseris pinnata, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea pinnata, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 516, t. 9, et t. 10, fig. 3; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 465.

Juan Fernandez.—Endemic. In stony mountainous localities—*Bertero; Douglas; Reed; Moseley.*

One of the larger species, reaching a height of fifteen feet and upwards.

Dendroseris sp. ?

Dendroseris, sp. ?

JUAN FERNANDEZ.—Endemic. *Reed.*

In Kew Herbarium is a specimen of a distinct plant, collected, or at least communicated, by Mr E. C. Reed, and bearing a name in the handwriting of Philippi; but we can find no publication of it, and there being only one leaf and portion of an old inflorescence, we cannot describe it.

CAMPANULACEÆ.

Lobelia anceps, Thunb.

Lobelia anceps, Thunb., Prodr. Fl. Cap., p. 40, fide A. DC., Prodr., vii. p. 375; Benth. Fl. Austr., iv. p. 128; Gay, Fl. Chil., iv. p. 325.
Lobelia alata, Labill, Pl. Nov. Holl., i. p. 51, t. 72.
Lobelia rupincola, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 120.

JUAN FERNANDEZ.—Humid places in English Bay—*Bertero.*

Common in Australia, also occurring in New Zealand, South Africa, and extratropical South America. Perhaps casually introduced into Juan Fernandez, as it is in no other collection.

Lobelia tupa, Linn.

Lobelia tupa, Linn., Sp. Pl., ed. 2, p. 1318; Bertero in Ann. Sc. Nat., xxi. p. 347.
Tupa feuillei, G. Don, Gen. Syst., iii. p. 700; DC., Prodr., vii. p. 391; Gay, Fl. Chil., iv. p. 328; Bot. Mag., t. 2550; Bot. Reg., t. 1612.
Rapuntium spicatum vulgo tupa, Feuillée, Journal des Observations, ii. p. 739, t. 29.

JUAN FERNANDEZ. *Douglas; Moseley.*

This very conspicuous plant does not figure in Philippi's list of Juan Fernandez plants, doubtless from an oversight; for Bertero (op. sup. cit.) states that it was very common, as it is also in Chili and some parts of Peru.

Wahlenbergia fernandeziana, A. DC. (Plate LVI., figs. 1–4.)

Wahlenbergia fernandeziana, A. DC., Monogr. Camp., p. 160; Prodr., vii. p. 438; Gay, Fl. Chil., iv. p. 339.
Wahlenbergia larrainii, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 118, t. 35 (reprint, p. 4).
Campanula larrainii, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In pastures and rocky situations—*Bertero; Scouler; Douglas; Mrs Graham.*

In Kew Herbarium there is a specimen of this plant received from the Paris Herbarium, labelled "Chili, M. Cl. Gay," but as there are no other continental specimens of this common Juan Fernandez species, it may be regarded as from Chili only, in the sense that the island belongs to that country.

Wahlenbergia grahamæ, Hemsl., n. sp. (Plate LVI., figs. 5, 10.)

Species aff. *Wahlenbergiæ fernandezianæ* a qua differt habitu robustiore foliis ovatis vel leviter cordato-ovatis minute denticulatis puberulis, floribus majoribus, corollæ lobis latioribus, &c.

Juan Fernandez.—Endemic. *Mrs Graham*, 1823; *Moseley*.

Mrs Graham's specimen of this previously undescribed species of *Wahlenbergia* was on a sheet with specimens of *Wahlenbergia fernandeziana*, from which it is easily distinguishable at a glance, as Miss Smith's drawing shows. Mr Moseley collected one sprig of the same species, which is in no other collection that we have seen.

Wahlenbergia tuberosa, Hook. f.

Wahlenbergia tuberosa, Hook. f., Bot. Mag., t. 6155.
Euphorbia masafueræ, Philippi in Bot. Zeit., 1856, p. 647, et in Cat. Pl. Vasc. Chil., p. 264.

Masafuera.—Endemic. *Leyboldt; Downton.*

It is remarkable that no other botanist or traveller who has investigated the flora of the island has collected this very distinct species, which was discovered in 1873 by Mr Downton, who introduced living plants for Messrs Veitch of Chelsea, where it flowered in 1874. Probably the slender flowering stems are of short duration, and the tuberous root-stock inconspicuous, hence the reason of its being overlooked. Leyboldt's specimen wants flowers.

Wahlenbergia berteroi, Hook. et Arn.

Wahlenbergia berteroi, Hook. et Arn. in Hook. Journ. Bot. i. (1834), p. 279, t. 137; DC., Prodr., vii p. 438; Gay, Fl. Chil., iv. p. 340.
Campanula gracilis, var. Colla in Mem. Accad. Sc. Torino, xxxviii. p. 119 (reprint, p. 5).

Juan Fernandez.—Endemic. In crevices of rocks in the higher mountains, and in Goat Island—*Bertero.*

Of this species we have only seen the one piece figured in the work cited above.

ERICACEÆ.

Pernettya rigida, DC.

Pernettya rigida, DC., Prodr., vii. p. 587; Philippi in Cat. Pl. Vasc. Chil., p. 194.
Arbutus rigida, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 120 (reprint, p. 6), t. 36.
Gaultheria mucronata, Hook. et Arn. in Hook. Journ. Bot., i. (1834), p. 281, partim.
Gaultheria mucronata, β *mutica*, Hook. et Arn., l. c.
Pernettya racemulosa, DC., Prodr., vii. p. 588.
Pernettya bridgesii, Philippi in Bot. Zeit., 1856, p. 646, et in Cat. Pl. Vasc. Chil., p. 194.

Juan Fernandez.—Thickets in the hills and mountains—*Bertero; Scouler; Douglas; Mrs Graham; Reed; Moseley; Downton.* Masafuera.—*Leyboldt.*

The genus *Pernettya* comprises about fifteen species, whereof one (or two?) inhabit the mountains of Tasmania and New Zealand, and the rest South America, including the Falkland Islands. In America the species range from Fuegia northward through the Andes to Mexico. *Pernettya rigida* is closely allied to *Pernettya mucronata*, one of the commoner species in the extreme south of America.

PRIMULACEÆ.

Centunculus pentandrus, R. Br.

Centunculus pentandrus, R. Br., Prodr. Fl. Nov. Holl., i. p. 47.
Micropyxis pumila, Duby in DC. Prodr., viii. p. 72.
Anagallis ovalis, Ruiz et Pav., Fl. Peruv. et Chil., ii. p. 8, t. 115; Philippi in Bot. Zeit., 1856, p. 629.
Anagallis pumila, Swartz, Fl. Ind. Occ., i. p. 345.

JUAN FERNANDEZ. *Philippi.*

A small annual plant now widely dispersed in Central and South America, the West Indies, Africa, East Indies, and Australia.

POLEMONIACEÆ.

Collomia gracilis, Douglas.

Collomia gracilis, Douglas in Bot. Reg., sub. t. 1622; DC., Prodr., ix. 308 (cum β *andicola*, Benth.); Philippi in Bot. Zeit., 1856, p. 629; Bot. Calif., i. p. 488; Gay, Fl. Chil., iv. p. 422.
Gilia gracilis, Hook., Bot. Mag., t. 2924.

JUAN FERNANDEZ. *Philippi.*

British Columbia and the Rocky Mountains to California, and common in Chili. An annual, probably an introduced plant in Juan Fernandez.

BORAGINEÆ.

Selkirkia, Hemsl.

Calyx parvus, alte 5-fidus, lobis ovatis obtusiusculus sub fructu occultis. Corollæ subrotatæ tubus brevis, sursum parum dilatatus, fauce gibbis vel plicis 5 convexis semicircularibus instructa; limbi lobi 5, imbricati, patentes, rotundati, undulati. Stamina 5, tubo affixa, inclusa vel subexserta, filamentis brevibus; antheræ oblongæ, obtusæ. Ovarii lobi 4, indistincti, jam tuberculati; stylus erectus, inclusus, stigmate capitato. Ovula angulo interno affixa, suberecta. Nuculæ 4, vel abortu pauciores, facie interna areola triangulari ad apicem gynobasi pyramidatæ affixæ, late alatæ, deorsum præcipue valde productæ, margine cristato-dentatæ, dorso tuberculis sæpius 3 vel 4 crassis elongatis rectis vel leviter, curvatis apice hispidulis instructæ. Semina in loculis deorsum productis pendula.

Selkirkia berteroi, Hemsl. (Plate LVII.)

Selkirkia berteroi, Hemsl.

Cynoglossum berterii, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 132, t. 43, mala; DC., Prodr. x. p. 153.

Frutex ramosus, 3–6 pedalibus, foliis lanceolatis confertis vix hispidulis, floribus albidis late cymoso-corymbosis.

Juan Fernandez. — Endemic. Declivities in the mountain woods of the higher regions—*Bertero; Reed; Downton; Moseley.*

At the date when Colla named this plant, the genus *Cynoglossum* was a most comprehensive one; yet he remarks that in habit it deviates widely from all its congeners; but ripe fruit was unknown to him. Independently of the shrubby habit, the flowers and fruit afford distinctive characters of generic value, as we think. It is named after Alexander Selkirk, who certainly deserves this kind of distinction as much as Defoe's imaginary hero, to whom De Candolle dedicated the Juan Fernandez genus *Robinsonia*.

In the present plant the normal scabridity of the Borragineæ is reduced to a minimum, and the inflorescence is altogether different from that of *Cynoglossum*. There are no scales in the throat of the corolla, but these are replaced by semicircular inflexions of the substance of the tube itself, which are concave without and convex within. The young ovules are suberect in the coarsely tuberculed lobes of the ovary, but from the whole downward extension of the cell cavity the seeds become pendulous in fact, if not in theory. The nutlets, of which sometimes only three grow out to maturity, are attached all along the inner surface to a pyramidal axis, and they are broadly winged and irregularly toothed, the wing being much extended below, thus concealing the small calyx, while the back is furnished with usually three or four coarse tubercules.

CONVOLVULACEÆ.

Calystegia tuguriorum, R. Br.

Calystegia tuguriorum, R. Br., Prodr. Fl. Nov. Holl., p. 483 in obvers.; Hook. f., Fl. N. Zeal., i. p. 183, t. 47.

Convolvulus tuguriorum, Forst., Fl. Ins. Austr. Prodr., p. 14; Hook. f., Handb. Fl. N. Zeal., p. 198.

Masafuera. *Downton.*

New Zealand; Chatham Islands; Chiloe and Valdivia.

Until we found the record (in the Handbook of the New Zealand Flora) of this plant from South America, we were under the impression that it was restricted to New Zealand. The Masafuera plant is exactly like New Zealand specimens; and although there are no South American specimens in Kew Herbarium bearing this name, there can be little doubt that the author of the New Zealand Flora referred to a specimen collected in Chiloe by Captain King, and another in Valdivia: the latter may be different.

SOLANACEÆ.

Solanum tuberosum, Linn.

Solanum tuberosum, Linn., Sp. Pl., ed 1, p. 185; DC., Prodr., xiii. 1, p. 31; Philippi in Bot. Zeit., 1856, p. 630; Gay, Fl. Chil., v. p. 74.

JUAN FERNANDEZ. *Philippi.*

The potato is included here on the authority of Philippi, who says nothing about its distribution in the island, where it is doubtless a colonist.

Solanum fernandezianum, Philippi.

Solanum fernandezianum, Philippi in Linnæa, xxix. p. 23; Baker in Journ. Linn. Soc. Lond., xx. p. 490.

JUAN FERNANDEZ.—Endemic? Shady woods on the higher mountains—*Bertero; Reed; Moseley.*

Philippi had seen no tubers when he described the species; but Bertero's label bears the following memorandum: *tubercula gustu amaro.* Mr Baker thinks this may be only a variety of *Solanum tuberosum*, and it is certainly very closely allied to that species.

Solanum furcatum, Dunal.

Solanum furcatum, Dunal in DC. Prodr., xiii. 1, p. 51; Philippi in Bot. Zeit., 1856, p. 629.

JUAN FERNANDEZ. *Philippi.*

For this species also Philippi is the sole authority. It is very closely allied to *Solanum nigrum*, if anything more than a form of that species, and is most likely an introduced plant in Juan Fernandez. It was founded upon Peruvian specimens.

Physalis pubescens, Linn.

Physalis pubescens, Linn., Sp. Pl., ed. 1, p. 183; DC., Prodr., xiii. 1, p. 446; Gay, Fl. Chil., v. p. 62

JUAN FERNANDEZ. *Philippi.*

A very widely dispersed plant in cultivated and waste ground, probably of recent introduction into the island.

Cestrum parqui, L'Herit.

Cestrum parqui, L'Herit., Stirp. Nov., i. p. 73, t. 36; Gay, Fl. Chil., v. p. 95; Bot. Mag., t. 1770; Bertero in Ann. Sc. Nat., xxi. p. 350.

JUAN FERNANDEZ. *Scouler; Moseley.*

Common in Chili, Peru, and some parts of Brazil, Uruguay, &c. It is not included in Philippi's list, nor is it in the set of Bertero's plants at Kew; but Scouler collected it in

the island in 1828, five years before Bertero's visit. Bertero (l. c.) states, however, that it was common in the vicinity of houses; but, like many other plants believed to possess medicinal virtues, it was imported from Chili.

Nicotiana cordifolia, Philippi.

Nicotiana cordifolia, Philippi in Bot. Zeit., 1856, p. 646.

MASAFUERA.—Endemic. *Philippi.*

Philippi describes this as a shrubby species allied to *Nicotiana solanifolia*, a Chilian species which we have not seen.

SCROPHULARINEÆ.

Mimulus parviflorus, Lindl.

Mimulus parviflorus, Lindl., Bot. Reg., t. 874; DC., Prodr., x. p. 371; Gay, Fl. Chil., v. p. 141; Philippi in Bot. Zeit., 1856, p. 629.

JUAN FERNANDEZ.—Introduced? *Philippi.*

A common Chilian species, included in Philippi's list of Juan Fernandez plants without any remarks.

VERBENACEÆ.

Rhaphithamnus longiflorus, Miers.

Rhaphithamnus longiflorus, Miers in Trans. Linn. Soc. Lond., xxvii. p. 98.
Citharexylum venustum, Philippi in Bot. Zeit., 1856, p. 646.

JUAN FERNANDEZ.—Endemic. Woods in the hills—*Bertero*, 1498, in part; *Mrs Graham; Scouler; Douglas; Moseley; Downton.* MASAFUERA.—*Reed.*

Apparently one of the commoner indigenous plants in the island. Mrs Graham notes that it is a large tree; Douglas says "a small shrub," and Philippi describes it as a small tree. It is, or was called "Arrayan macho" or "espinillo."

The genus comprises about half a dozen closely allied species, four of which inhabit the mainland of Chili. The following, of which the flowers are unknown, is most likely only a barren state of *Rhaphithamnus longiflorus.*

Rhaphithamnus serratifolius, Miers.

Rhaphithamnus serratifolius, Miers in Trans. Linn. Soc. Lond., xxvii. p. 99.

JUAN FERNANDEZ.—Endemic. In the higher mountains—*Bertero*, 1498, in part; *Reed.*

LABIATÆ.

Cuminia brevidens, Benth.

Cuminia brevidens, Benth. in DC. Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 510.

Juan Fernandez.—Endemic. In mountain woods—*Bertero*, 1490, in part; *Reed*; *Philippi*.

Cuminia is a shrubby or subarboreous genus restricted to the island of Juan Fernandez.

Cuminia eriantha, Benth. (Plate LVIII.)

Cuminia eriantha, Benth. in DC. Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 511.
Bystropogon erianthus, Benth., Labiatæ, Suppl., p. 727.

Juan Fernandez. — Endemic. In the hills—*Mrs Graham*; *Gay*; *Moseley*; *Downton*.

The plant collected by Downton and figured in this work is, in some of its characters, intermediate between typical *Cuminia fernandezia* and *Cuminia eriantha*, and which, perhaps, should rank only as varieties of one species. There is only one specimen in the Kew Herbarium of *Cuminia fernandezia*, and that is perfectly glabrous, except the corolla and a line of short white hairs on each side across the nodes from petiole to petiole. Further, the leaves are narrower, with a cuneate base; the inflorescence is looser, and the peduncles and pedicels are very slender. Typical *Cuminia eriantha* has pubescent branches, leaves (under surface chiefly), inflorescence, and flowers, including the calyx; and the inflorescence is denser, with relatively short, stout peduncle and pedicels. Downton's plant is altogether less hairy, and the calyx is quite glabrous, while the inflorescence is nearly as loose as that of *Cuminia fernandezia*.

The flowers of all the species of *Cuminia* are dimorphic and functionally unisexual; the two forms often occurring in the same inflorescence, though the male flowers are much more numerous than the females in all the specimens examined. Some of the specimens bear, or rather bore, for they are all fallen, male flowers only, which, soon after they have discharged their pollen, disarticulate close under the calyx. As represented in the accompanying figure of *Cuminia eriantha*, the corolla of the male flowers is considerably larger, the shorter style does not reach the anthers, and only rudimentary ovules were found. The female flowers contain rudimentary stamens, some of them with and some of them without anthers, and always (?) destitute of pollen. Possibly the flowers are sometimes polygamously monœcious.

Cuminia fernandezia, Colla.

Cuminia fernandezia, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 139 (reprint, p. 25), t. 47; DC., Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 510.

Juan Fernandez.—Endemic. In mountain woods—*Bertero*, 1490, in part.

Not in any of the recent collections.

PLANTAGINEÆ.

Plantago fernandeziana, Bertero.

Plantago fernandeziana, Bertero ex Barnéoud, Monogr. Plantag., p. 47; DC., Prodr., xiii. 1, p. 704; Gay, Fl. Chil., v. p. 202.
Robinsonia? nervosa, Philippi in Bot. Zeit., 1856, p. 645, et Cat. Pl. Vasc. Chil., p. 176.

Juan Fernandez.—Endemic. Rocky places in the higher mountains near Portezuelo—*Bertero; Germain.*

A very striking species, with a stem from three to six feet high.

INCOMPLETÆ.

CHENOPODIACEÆ.

Roubieva multifida, Moq.

Roubieva multifida, Moq. in Ann. Sc. Nat., sér. 2, i. p. 292, t. 10, fig. B., et in DC. Prodr., xiii. 2, p. 80.
Ambrina pinnatisecta, Spach, Veg. Phanerog., v. p. 296.
Chenopodium multifidum, Linn., Sp. Pl., ed. 1, p. 220.
Blitum tenue, Moq. in DC. Prodr., xiii. 2, p. 81; Gay, Fl. Chil., v. p. 238.
Chenopodium tenue, Colla in Mem. Accad. Sc. Torino, xxxix. p. 9, t. 50.
Ambrina tenuis, Moq., Chenop. Enum., p. 42.

Juan Fernandez.—In stony places—*Bertero.*

A common plant in Chili and other parts of South America, as well as in more distant regions. It is in none of the more recent collections, and is probably a colonist of casual occurrence in the island. There is no doubt that Colla's *Chenopodium tenue* is this plant, and just the ordinary form; Bertero himself mistook it for the Paico or Payco, *Chenopodium ambrosioides*, Linn., a similar plant, now widely dispersed, and eaten as a vegetable in South America.

Salicornia peruviana, H. B. K.

Salicornia peruviana, H. B. K., Nov. Gen. et Sp., ii. p. 193; Gay, Fl. Chil., v. p. 245; DC., Prodr., xiii. 2, p. 145.

Juan Fernandez.—In stony brackish places near El Puente—*Bertero.* Masafuera.—*Germain.*

Apparently the same species that is common on the western coast of South America, and perhaps only a form of a species having a much wider range of distribution; but this point can only be settled by a thorough investigation of the genus.

[Bertero (Ann. Sc. Nat., xxi. p. 348) mentions a shrubby species of *Atriplex* as growing in Goat Island. It is the number 105 of Colla's Plantæ Rariores (Mem. Accad. Sc. Torino, xxxix. p. 8), who describes the stems and leaves, but gives it no name beyond *Atriplex?* Bertero noted on his label "Caulis frutescens 3-4 pedalis, flores haud vidi."]

POLYGONACEÆ.

Rumex acetosella, Linn.

Rumex acetosella, Linn., Sp. Pl., ed. 1, p. 338; Gay, Fl. Chil., v. p. 279; Philippi in Bot. Zeit., 1856, p. 629; Benth., Fl. Austr., v. p. 265.

JUAN FERNANDEZ.—Introduced. *Philippi; Moseley.*

A native of Temperate Europe and Asia, now naturalised in North America, and in many parts of the southern hemisphere, including Chili, where it is common.

PIPERACEÆ.

Lactoris fernandezia, Philippi. (Plate LIX.)

Lactoris fernandeziana, Philippi in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, Abhandl., xv. p. 521, t. 13; Benth. et Hook., Gen. Pl., iii. p. 127.

Ansonia nodulosa, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In moist shady woods in the higher mountains—*Bertero; Reed; Moseley; Downton.*

One of the most remarkable plants of the island, differing from all other members of the order in its inflorescence and in having a perianth. Reed says the smell and taste are "peppery." We find the flowers polygamously monœcious.

Peperomia fernandeziana, Miq.

Peperomia fernandeziana, Miq., Syst. Pip., p. 139; Gay, Fl. Chil., v. p. 378; DC., Prodr., xvi. 1, p. 445.

JUAN FERNANDEZ.—Endemic. Shady woods in the higher mountains—*Bertero;* hills to the west of Cumberland Bay, at 1800 feet above the sea—*Reed.*

Also found in Valdivia and other parts of Chili, and recorded by C. de Candolle (Prodromus, xvi. 1, p. 445) from Pinchincha and Wahoo, but these localities may belong to some other species, like the figure in Wight's Icones cited in the same place.

Peperomia berteroana, Miq.

Peperomia berteroana, Miq., Syst. Pip., p. 114, et Ill. Pip., p. 17, t. 11; DC., Prodr., xvi. 1, p. 414; Gay, Fl. Chil., v. p. 377.

JUAN FERNANDEZ.—Endemic. Rocky places in the higher mountains—*Bertero; Reed; Moseley.*

Peperomia margaritifera, Bertero.

Peperomia margaritifera, Bertero ex Hook., Ic. Pl., i. t. 91; DC., Prodr., xvi. 1, p. 439; Miq., Syst. Pip., p. 112, et Ill. Pip., p. 16, t. 10; Gay, Fl. Chil., v. p. 376.

JUAN FERNANDEZ.—Endemic. On shady declivities of the higher mountains—*Bertero*, 1493.

A remarkable species not collected by recent travellers.

SANTALACEÆ.

Santalum.

JUAN FERNANDEZ.

Sandalwood of some kind formerly abounded in the island, as we learn from the narratives of the early voyagers, and from the dead trunks of the tree existing as recently as 1856. Gay names the Juan Fernandez sandalwood *Santalum album*, without doubt, but it seems very uncertain whether it belongs to this genus even; for, although it is Polynesian (including the Sandwich Islands), it is not represented in America. See paragraph thereon in the introductory notes to this part, p. 11.

LORANTHACEÆ.

Loranthus berteroi, Hook. et Arn.

Loranthus berteroi, Hook. et Arn. in Hook. Bot. Misc. (1833), iii. p. 357; Walp., Repert. Bot. Syst., ii. p. 445.
Loranthus venetus, Bert. MSS., non H. B. K.
Loranthus tetrandrus, Philippi in Bot. Zeit., 1856, p. 628, non Ruiz et Pavon.

JUAN FERNANDEZ.—Endemic. Parasitic on *Myrtus fernandeziana*—*Bertero.*

We have only seen Bertero's specimen, which is a good one, and evidently distinct from *Loranthus tetraphyllus*. Of course the latter may also occur in the island; yet as Philippi has only one species, there is some justification for assuming that it is *Loranthus berteroi.*

EUPHORBIACEÆ.

Dysopsis gayana, Baill.

Dysopsis gayana, Baill., Etude Général des Euphorbiacées, p. 436.
Molina chilensis, Gay, Fl. Chil., v. p. 346, et Atl., t. 62.
Mirabellia glechomoides, Bertero MSS. cited in Steudel's Nomencl. Bot., and also by Baillon.
Bowlesia crenata, Desv. ex DC., Prodr., iv. p. 70.
Hydrocotyle glechomoides, Rich., Monogr. Hydrocot., n. 14, t. 58, fig. 17.
Dysopsis glechomoides, α *hirsuta*, Müll., Arg. in DC. Prodr., xv. 1, p. 949.

JUAN FERNANDEZ.—Humid shady places in the mountain woods—*Bertero; Reed; Moseley.*

In Ecuador, and very common in Valdivia and Chiloe; also in Fuegia.

Müller (l. c.) defines two other varieties; the insular form differing from them mainly in being clothed with longer hairs.

URTICACEÆ.

Urtica masafueræ, Philippi.

Urtica masafueræ, Philippi in Bot. Zeit., 1856, p. 647; Wedd. in DC. Prodr., xvi. 1, p. 42.

MASAFUERA.—Endemic? *Germain.*

A very distinct and elegant little plant; but Weddell (l. c.) says: "Huc referenda sunt, ni fallor, specimina quædam a beato Hilario in sylvis umbrosis prope Montevideo lecta et in herb. mus. Par. servata. Hæc olim pro varietatibus *Urticæ magellanicæ* habui, et non erit mirandum si aliquando, iterum scrutata, ad eamdam sententiam redirent botanici. Planta montevidensis multo elatior est quam masafuerensis foliisque majoribus donata, serraturis seu crenis obtusis utrinque 4–6."

Urtica glomerulæflora, Steud.

Urtica glomerulæflora, Steud. in Flora (1850), xxxiii. p. 257; DC., Prodr., xvi. 1, p. 57; Blume, Mus. Bot. Lugd.-Bat., ii. p. 154; Wedd., Monogr., p. 94.
Boehmeria fernandeziana, Gay, Fl. Chil., v. p. 360.

JUAN FERNANDEZ.—Endemic. In the mountain woods—*Bertero.*

Moseley collected an *Urtica*, without lateral branchlets, in which the spherical clusters of flowers are distinctly pedunculate, otherwise there are no prominent characters to distinguish it from the present.

Boehmeria excelsa, Wedd.

Boehmeria excelsa, Wedd. in Ann. Sc. Nat., sér. 4, i. p. 202, Monogr. Urt., p. 352, et in DC. Prodr., xvi. 1, p. 200.
Procris excelsa, Steud. in Flora (1850), xxxiii. p. 261.
Splitgerbera denudata, Gay, Fl. Chil., v. p. 362.
Urtica excelsa, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In shady woods along the mountain streams—*Bertero; Cuming; Reed; Moseley.*

Bertero states (Ann. Sc. Nat., xxi. p. 347) that this is a tree ten to twenty feet high, called "Manzano" by the natives.

Parietaria debilis, G. Forst.

Parietaria debilis, G. Forst., Fl. Ins. Aust. Prodr., n. 387; Wedd. in DC. Prodr., xvi. i. p. 235[45] (varietates α *micrantha* et β *gracilis*).
Freirea erecta, Philippi, Fl. Atacam., p. 49.
Freirea fernandeziana, Steud., Nomencl. Bot.
Urtica fernandeziana, Steud. in Flora (1850), xxxiii. p. 259.

JUAN FERNANDEZ. *Bertero; Reed; Moseley.*

A very widely dispersed plant, often occurring only as a weed of cultivation or an escape therefrom.

MONOCOTYLEDONES.

BROMELIACEÆ.

Ochagavia elegans, Philippi.

Ochagavia elegans, Philippi in Bot. Zeit., 1856, p. 647.

JUAN FERNANDEZ.—Endemic. *Germain.*

From the description this must be a very pretty and distinct little plant, with rosy flowers and silvery leaves about four inches long. We have seen no specimen of it; but in Kew Herbarium there are leaves of a Bromeliaceous plant, probably a *Tillandsia* collected by Bertero in shady woods in the very highest part of the mountains. They are narrow, and about eighteen inches long. Bertero himself (Ann. Sc. Nat., xxi. p. 348) states that a *Tillandsia*, or a species of some closely allied genus, was met with on the highest mountains, and a *Bromelia*, near *Bromelia discolor*, was very common on dry elevated rocks in the mountains. The former was probably the *Ochagavia elegans* of Philippi.

IRIDEÆ.

Libertia formosa, Graham.

Libertia formosa, Graham in Edinb. New Philos. Journ., Oct. 1833, p. 383; Bot. Reg., t. 1630; Bot. Mag., t. 3294; Gay, Fl. Chil., vi. p. 30.
Libertia crassa, Graham, l. c.?
Libertia grandiflora, Philippi in Bot. Zeit., 1856, p. 648, non Sweet.

JUAN FERNANDEZ. *Mrs Graham; Bertero; Cuming; Reed; Moseley.* MASAFUERA. *Germain; Downton.*

Valdivia and Chiloe, and southward.

Apparently one of the commoner plants of the islands. Philippi regards the insular plant as specifically different from the Chilian, but some of the specimens from the mainland are as big and robust as those from Juan Fernandez. Should it prove to be really different, Graham's name *crassa* may perhaps stand for it, but we have seen no authentically named specimen of that. Philippi's name is occupied by a New Zealand plant. Mr Downton, who collected in Juan Fernandez, introduced the plant into England for Messrs Veitch, with whom it flowered in 1876. The cultivated plant was about three feet high, with leaves nearly as long as the flower-stem, and the expanded flower was an inch and a quarter across.

PALMÆ.

Juania australis, Drude.

Juania australis, Drude ex Hook. f. in Append. Rep. Progr. and Cond., Roy. Gard., Kew, 1884, p. 57.
Ceroxylon? australe, Mart., Hist. Nat. Palm., iii. p. 315.
Morenia chonta, Philippi in Bot. Zeit., 1856, pp. 648 et 818.

JUAN FERNANDEZ.—Endemic. Dense woods on the mountains—*Bertero; Germain.*

"Chonta" is the native name of this Palm, which is peculiar to Juan Fernandez. According to Germain, as recorded by Philippi (l.c.), it is dicœcious, and the trunk attains a height of eighty to ninety feet. It is stated in Sutcliffe's Crusoniana, p. 28, that the Cabbage Palm or Chonta was abundant during Alexander Selkirk's stay on the island (1704–1709); but in Walter's account of Commodore Anson's visit, as quoted by Sutcliffe, p. 67, the number of trees in 1741 was small, and most of them were growing on precipices and in dangerous situations. Moseley states[1] that from a certain point in the island one could count the number of trees remaining.

Philippi (Bot. Zeit., 1856, p. 634) describes the Chonta as a very slender and graceful Palm; the trunk, though rarely exceeding eight inches in diameter, rises high above the tallest forest trees, where its head of waving feathery leaves is very effective. The dark green trunk is quite smooth and shining, and the leaf-scars are about eight inches asunder. The scarlet fruit is about the size of a bullet, and hangs in elegant festoons, adding greatly to the beauty of the tree.

JUNCACEÆ.

Juncus microcephalus, H. B. K.

Juncus microcephalus, H. B. K., Nov. Gen. et Sp., i. p. 237; Gay, Fl. Chil., vi. p. 141; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 406.

Juan Fernandez.—In humid pastures—*Bertero; Scouler; Douglas; Reed; Moseley.*

A common and variable American species, ranging from Mexico to Uruguay and Chili.

Juncus acutus, Linn.

Juncus acutus, Linn., Sp. Pl., ed. 1, p. 325; Gay, Fl. Chil., vi. p. 140; Buchenau in Abhandl. naturw. Vereins, Bremen, iv. p. 421, et vi. p. 389.
Juncus macrocarpus, Nees in Linnæa, xx. p. 243.

Juan Fernandez. *Scouler.*

A maritime species inhabiting the coast of western and southern Europe, from the south of England; North and South Africa, and both sides of South America.

Juncus dombeyanus, J. Gay.

Juncus dombeyanus, J. Gay in Laharpe Monogr. Junc., p. 132; C. Gay, Fl. Chil., vi. p. 142; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 408; Philippi in Bot. Zeit., 1856, p. 630.

Juan Fernandez. *Germain.*

This is the only *Juncus* in Philippi's list; and it is also recorded from Juan Fernandez by Buchenau, but there are no authentically named specimens of this species at Kew. It is, however, evidently so near *Juncus microcephalus* as to be hardly separable as a species. It is also recorded from the southern provinces of Chili.

[1] Notes by a Naturalist on the Challenger, p. 541.

Juncus chamissonis, Kunth.

Juncus chamissonis, Kunth, Enum. Pl., iii. p. 348; Gay, Fl. Chil., vi. p. 145; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 379.
Juncus imbricatus, Laharpe, Monogr. Junc., p. 149, *pro parte*.

Juan Fernandez.—In hilly pastures; frequent—*Bertero; Reed; Moseley.*

Ecuador and Brazil, southward to Uruguay and Chili.[1]

CYPERACEÆ.

Cyperus reflexus, Vahl.

Cyperus reflexus, Vahl, Enum. Pl., ii. p. 299; Kunth, Enum. Pl., ii. p. 42; Bœckeler in Linnæa, xxxv. p. 558; Clarke in Journ. Linn. Soc. Lond., xxi. p. 116; Gay, Fl. Chil., vi. p. 166.
Cyperus fernandezianus, Colla in Mem. Accad. Sc. Torino, xxxix. p. 21, t. 56; Steud., Cyperaceæ, p. 8; Gay, l. c., p. 163.
Cyperus hæmatostachys, Steud., op. cit., p. 41.

Juan Fernandez.—In pastures—*Bertero; Scouler; Reed; Moseley.*

Brazil, Uruguay, and Chili.

Colla's plant is certainly this rather than *Cyperus vegetus*, which Gay says it resembles; in fact, Bertero's specimens in the Kew Herbarium agree very well with Colla's rude figure.

Cyperus vegetus, Willd.

Cyperus vegetus, Willd., Sp. Pl., i. p. 283; Kunth, Enum. Pl., ii. p. 40; Bœckeler in Linnæa, xxxv. p. 550; Gay, Fl. Chil., p. 167.

Juan Fernandez.—In wet pastures—*Bertero; Scouler; Moseley.* Masafuera.—*Germain.*

Also a native of Chili and Brazil.

Cyperus sp.

Juan Fernandez. *Scouler.*

Two specimens in a very young state—too young for identification, but apparently allied to *Cyperus brachystachys*, Hook. f., from the Galapagos Islands.

Scirpus nodosus, Rottb.

Scirpus nodosus, Rottb., Descr. et Ic. Pl., p. 52, t. 8, fig. 3; Benth., Fl. Austr., vii. p. 231.
Isolepsis nodosa, R. Br., Prodr. Fl. Nov. Holl., p. 221; Kunth, Enum. Pl., ii. p. 199; Rich., Fl. Nouv. Zél., t. 18; Gay, Fl. Chil., vi. p. 185.

Juan Fernandez. *Moseley.*

[1] Mr W. Mitten sends cultivated specimens of a *Juncus* "raised from seeds shaken out of Juan Fernandez mosses." It is a very slender form of *Juncus effusus*, Linn., or a closely allied species. Dr Buchenau, to whom an imperfect specimen was sent, suggests that it may be *Juncus pauciflorus*, R. Br., a common Australian species: but, in the absence of more complete specimens, the species is indeterminable.

This plant inhabits Chili, South Africa, Australia, New Zealand, New Caledonia, St. Paul Island, and St Helena, being the commonest Glumifera in the last-named island. We have only seen it from Juan Fernandez in Mr Moseley's collection, without any information concerning the locality.

Cladium scirpoideum, Benth. et Hook. f. (Plate LX.)

Cladium scirpoideum, Benth. et Hook. f., Gen. Pl., iii. p. 1066.
Terobera scirpoidea, Steud., Cyperaceæ, p. 164.
Agylla ensifolia, Philippi in Anales Univ. Chili, 1865, i. p. 643, et in Cat. Pl. Vasc. Chil., p. 302.
Vincentia scirpoidea, Bœckeler in Linnæa, xxxviii. p. 250, *partim*.

Juan Fernandez.—By the side of the stream in swampy ground, covering a considerable area—*Moseley; Reed.*

Of this very remarkable plant, we have seen no specimens in the older collections, therefore it is probably local in its occurrence. Steudel cites Bertero's No. 1509 for this plant, a number apparently not represented in Kew Herbarium. *Terobera* is an anagram of Bertero. Bœckeler (l. c.) has confused a Brazilian species with this. The two plants bear a strong general resemblance to each other, both in foliage and inflorescence, but, as the analyses of the flowers in our Plate show, they are quite distinct. The Brazilian species may be named *Cladium ficticium*, Hemsley. There are no ripe nuts of either species, but the spikelets afford characters by which they are easily recognised. In *Cladium scirpoideum* the spikelets are looser, and the longer glumes are produced at the tip into long awn-like points, while in *Cladium ficticium* they are broader, and the flowering ones scarcely acute. The habitat of the latter is uncertain; none of the Kew set of Glaziou's plants are localised, and some labelled Province of Rio are clearly not from that province. Moseley collected only leaves of *Cladium scirpoideum*, the longest of which are about four feet.

Uncinia douglasii, Boott.

Uncinia douglasii, Boott in Hook. f. Fl. Antarct., p. 369; Clarke in Journ. Linn. Soc. Lond., xx. p. 401; Gay, Fl. Chil., vi. p. 228.

Juan Fernandez. *Douglas; Reed; Moseley.* Masafuera. *Leyboldt.*

A distinct species, apparently restricted to these islands.

Carex paleata, Boott.

Carex paleata, Boott in Trans. Linn. Soc. Lond., xx. p. 127, et Illustr. Gen. Carex, t. 116; Gay, Fl. Chil. vi. p. 219.

Juan Fernandez.—Endemic. *Scouler; Cuming*, 1341; *Reed; Moseley.* Masafuera. *Germain.*

GRAMINEÆ.

Paspalum distichum, Linn.

Paspalum distichum, Linn., Sp. Pl., ed. 2, i. p. 82; Kunth, Enum. Pl., i. p. 52; Benth., Fl. Austr., vii. p. 461.
Paspalum vaginatum, Swartz, Fl. Ind. Occ., i. p. 135; Desvaux in Gay Fl. Chil., vi. p. 239.
Paspalum fernandezianum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 26, t. 59; Steud., Gramineæ, p. 32.
Paspalum chepica, Steud., l. c., p. 21.

Juan Fernandez.—In hill pastures, frequent—*Bertero.*

Very widely dispersed in warm countries, including Chili.

The Juan Fernandez plant is remarkable for its hairiness, which, though exaggerated in Colla's figure, is very prominent. Desvaux (l. c.) doubtingly referred *Paspalum fernandezianum* to *Paspalum vaginatum*, and the late General Munro absolutely referred it to *Paspalum distichum* in Kew Herbarium, merely distinguishing it as "*varietas foliis hirsutis.*" The latter botanist is followed here in the reduction of *Paspalum vaginatum* to *Paspalum distichum*. Although Bertero signalises it as frequent on his label, this grass is not in any of the recent collections.

Phalaris intermedia, Bosc.

Phalaris intermedia, Bosc. in Poiret (Lamarck) Encycl. Suppl., i. p. 300; Chapm., Fl. Southern U.S., p. 569.
Phalaris microstachya, DC., Cat. Monsp., p. 131; Kunth, Enum. Pl., i. p. 32; Gay, Fl. Chil., vi. p. 255; Trin., Ic. Gram., t. 77.
Phalaris angusta, Necs, Agrostogr. Brasil., p. 391; Trin., Ic. Gram., t. 78.
Phalaris robinsoniana, Ness MSS. ex Steud. Gramineæ, p. 11.
Phalaris chilensis, Presl, Reliq. Hænk. i. p. 245.
Phalaris americana, Ell., Sketch Bot. N. Carol., i. p. 101.

Juan Fernandez. *Cuming; Reed; Germain.*

A very common grass in many parts of America from Carolina to Chili. The synonymy given above is based upon the late General Munro's notes in the Kew Herbarium, but it is probably incomplete.

Anthoxanthum odoratum, Linn.

Anthoxanthum odoratum, Linn., Sp. Pl., ed. 1, p. 28; Kunth, Enum. Pl., i. p. 38; Benth., Fl. Austr., vii. p. 557; Hook. f., Handb. Fl. N. Zeal., p. 321.

Juan Fernandez and Masafuera. *Reed.*

This grass colonises freely, and is now very common in many countries in the southern hemisphere, even in remote localities in New Zealand as well as in islands like the present; but there are good grounds for the opinion that it is of northern origin. In the Kew Herbarium there is a specimen which is three feet long, from Diana's Peak, St Helena.

Stipa (Stephanantha) fernandeziana, Philippi.

Stipa (Stephanantha) fernandeziana, Philippi, Descr. Nuevas Plantas, 1873, p. 84, non Steud.

JUAN FERNANDEZ.—Endemic. *Philippi.*

There are no specimens at Kew agreeing with Philippi's description, according to which the leaves are hairy and the awn "*basi valde pilosa.*"

Stipa bicolor, Vahl.

Stipa bicolor, Vahl, Symb., ii. p. 24; Cav., Ic. Pl., v. t. 466; Kunth, Enum. Pl., i. p. 181; Gay, Fl. Chil., vi. p. 287.
Stipa neesiana, γ fernandeziana, Trin.; Munro MSS. in Herb. Kew.
Stipa fernandeziana, Steud., Gramineæ, p. 124, non Philippi.

JUAN FERNANDEZ. *Douglas; Cuming; Reed.*

Not uncommon in extratropical South America.

On the label attached to Douglas's specimen in the Kew Herbarium it is noted that this grass grows from six to seven feet high in Juan Fernandez. There is some confusion of the synonymy of *Stipa bicolor* and *Piptochætium bicolor*, Desv., which has arisen doubtless in consequence of the strong general resemblance of the two plants. Desvaux cites *Stipa bicolor*, Vahl non Trin. et Rupr., as a synonym of his plant, while Munro makes it a true *Stipa*. Philippi includes *Stipa manicata*, Desv., in his list, and Desvaux himself queries this as being the same as *Stipa bicolor*, Cav.

Piptochætium bicolor, Desv.

Piptochætium bicolor, Desv. in Gay Fl. Chil., vi. p. 273.
Urachne (Piptochætium) stipoides, Trin.; Munro MSS. in Herb. Kew.

JUAN FERNANDEZ. *Reed; Moseley.*

This is also a native of Mendoza and Monte Video, and perhaps also of some parts of Brazil. It is placed in *Oryzopsis*, as that genus is limited by Bentham and Hooker; but as no name for it exists under that genus, and the synonymy is involved, we leave it to be dealt with by some future monographer.

Polypogon crinitus, Trin.

Polypogon crinitus, Trin., Gram. uni- et sesquifl., p. 171; Steud., Gramineæ, p. 183; Gay, Fl. Chil., vi. p. 297.
Polypogon australis, Brongn. in Duperry's Voyage, Bot. Phanerog., p. 21.

JUAN FERNANDEZ.—In wet pastures, and by ditches—*Bertero; Scouler.*

Many critical species of this genus have been proposed that cannot be regarded as of higher rank than accidental forms of *Polypogon monspeliensis* and other widely naturalised species, and this seems to be one of them.

Nowodworskya imberbis, Philippi.

Nowodworskya imberbis, Philippi, Descr. Nuevas Plantas, 1873, p. 86.

JUAN FERNANDEZ. *Philippi.*

There is nothing in the collections examined answering to Philippi's description. *Nowodworskya* is incorporated with *Polypogon* by Bentham and Hooker.

Chætotropis chilensis, Kunth.

Chætotropis chilensis, Kunth, Rev. Gram., i. p. 271, t. 47, et Enum. Pl., i. p. 231 ; Gay, Fl. Chil., vi. p. 303.
Polypogon chætotropis, Trin. ; Steud., Gramineæ, p. 184.
Chætotropis latifolia, Philippi in Linnæa, xxx. p. 205.

JUAN FERNANDEZ.—In wet pastures—*Bertero ; Scouler ; Cuming ; Douglas.*

Also in Chili, but apparently rare, for in the Kew Herbarium there is only Philippi's *Chætotropis latifolia*, certainly from the mainland ; a specimen labelled "Chili, Gay," may be from Juan Fernandez, as some of his plants thus labelled are known to be ; yet the original *Chætotropis chilensis* is recorded from "Concepcion Islands" by Kunth and D'Urville. Gay merely repeats this record without any remarks of his own. Philippi's proposed new species from Ilque, near Puerto Montt, does not seem to deserve the rank even of a variety, for the leaves of the Juan Fernandez specimens vary from two to six lines in width ; and the inflorescence of Douglas's specimens, which were "four to six feet high," is from eight to ten inches in length.

Aira caryophyllea, Linn.

Aira caryophyllea, Linn., Sp. Pl., ed. 1, p. 66 ; Kunth, Enum. Pl., i. p. 289 ; Benth., Fl. Austr., vii. p. 585 ; Gay, Fl. Chil., vi. p. 333.

JUAN FERNANDEZ. *Moseley ; Reed.* MASAFUERA. *Germain.*

A native of Europe and the Mediterranean region, now naturalised in many other countries. In the work cited above Mr Bentham says of this, "generally distributed over the area of the genus," without stating whether he considers it indigenous in Australia or not, though of *Aira præcox* he says, "probably introduced only into Australia."

Aira præcox, Linn.

Aira præcox, Linn., Sp. Pl., ed. i, p. 65 ; Kunth, Enum. Pl., i. p. 289 ; Benth., Fl. Austr., vii. p. 585.

JUAN FERNANDEZ. *Moseley.*

Doubtless introduced here as well as in America, and in all southern countries where it exists.

Trisetum (Kœleria) laxum, Philippi.

Trisetum (*Kœleria*) *laxum*, Philippi, Descr. Nuevas Plantas, 1873, p. 92.

JUAN FERNANDEZ. *Philippi.*

There is no authentically named specimen of this plant in the collections examined, and none that agrees with the description.

Trisetum variabile, Desv.

Trisetum variabile, Desv. in Gay Fl. Chil., vi. p. 351; Philippi in Bot. Zeit., 1856, p. 630.
Trisetum malacophyllum, Steud., Gramineæ, p. 229.

JUAN FERNANDEZ. *Philippi; Moseley.*

Founded by Desvaux on Chilian specimens, with the remark that it is sufficiently near *Trisetum subspicatum*—"Esta planta es bastante vecina del *Trisetum subspicatum*." In the Kew Herbarium there is a specimen from Juan Fernandez collected, or at least communicated by Reed, and named *Trisetum chromostachyum*, Desv.? var. *vaginatum*.

Steudel cites Bertero's No. 998 for his *Trisetum malacophyllum*, and Desvaux the same number for his *Trisetum variabile*, so it may be assumed that they represent the same plant. Indeed, there is little doubt that these and several other proposed South American species belong to the generally diffused *Trisetum subspicatum*, Beauv.

Pantathera fernandeziana, Philippi. (Plate LXI.)

Pantathera fernandeziana, Philippi in Bot. Zeit., 1856, p. 649; Benth. et Hook., Gen. Pl., iii. p. 1200.

JUAN FERNANDEZ. — In woods of the higher mountains — *Bertero; Douglas; Reed; Philippi; Moseley.* MASAFUERA.—*Germain.*

This remarkable grass is restricted to the islands, where, however, it would appear to abound, for it is in nearly all the collections; yet we find no description of it earlier than Philippi's in 1856. But as Bertero collected it the probabilities of its being somewhere described are great, especially as it is a large grass of distinct aspect. The specimens vary in length from about fifteen inches with the root, to two feet and a half without the root, and judging from the latter, the culms sometimes reach as much as three feet in length; but they are slender, and probably more or less procumbent. Among the numerous specimens in the Kew Herbarium, it was difficult to find perfect flowers and grain, as they are eaten by some insect, though fortunately those collected by Moseley furnish both flowers and mature grain for the accompanying plate. Philippi mentions that his specimens were in the same condition, and he was unable to describe either stamens or pistil. The outer glumes have been described as three-nerved, but they are really five-nerved, the two lateral nerves on each side being confluent from the base upwards to the middle of the glume or even higher; and the very coriaceous flowering glume is also five-nerved, though inconspicuously. The spikelets are much laterally compressed, and the glumes consequently

strongly keeled, and the long awns spread and curve downwards only with age. Curiously enough, the ovary in all the flowers examined bore three distinct styles; this was so in flowers from different spikelets from the same specimen. In a quite young state the ovary is glabrous, and the ripe caryopsis also; but some unfertilised misshapen ovaries of intermediate age were found, which were a little hairy about the upper part. No trace was seen of the hairy appendage characteristic of the genus *Bromus*. The ripe caryopsis is about three lines long, free from the glume and pale, though very closely invested by them. We have found nothing at all like this grass from the mainland, and it differs even more from the ordinary *Bromus* than the somewhat anomalous species of *Agrostis*, endemic in the Tristan da Cunha group and St Paul Island, do from the normal *Agrostis*.

Podophorus bromoides, Philippi. (Plate LXII.)

Podophorus bromoides, Philippi in Bot. Zeit., 1856, p. 649; Benth. et Hook., Gen. Pl., iii. p. 1200.

Juan Fernandez.—Endemic—*Philippi*.

Of this curious grass we have seen only one specimen, sent to Kew by Philippi himself in 1861. The prolongation of the rhachilla beyond the single floret of the spikelet, is a striking characteristic of the genus; the same thing occurs in the otherwise very different *Gymnopogon*.

Bromus unioloides, H. B. K.

Bromus unioloides, H. B. K., Nov. Gen. et Sp., i. p. 151; Kunth, Enum. Pl., i. p. 415; Gay, Fl. Chil., vi. p. 438.
Bromus hœnkeanus, Kunth, Enum. Pl., i. p. 416.
Bromus stamineus, Desvaux in Gay Fl. Chil., vi. p. 440?
Bromus catharticus, Vahl, Symb., ii. p. 22?
Ceratochloa unioloides, DC., Cat. Hort. Monsp., p. 92; Benth., Fl. Austr., vii. p. 662.
Bromus schraderi, Kunth, Enum. Pl., i. p. 416.

Juan Fernandez. *Cuming; Philippi.*

Philippi sent his specimen named *Bromus catharticus*, Vahl (*Bromus stamineus*, Desv.)

A very common American grass, ranging from British Columbia southward to Patagonia; commonly cultivated under various names, and now naturalised in many other countries.

Bromus cebadilla, Steud.

Bromus cebadilla, Steud., Gramineæ, p. 321.

Juan Fernandez. *Bertero.*

Also in Chili, according to Steudel, who cites the numbers 117, 118, 861, and 1411 of Bertero's collection. The name is not included in Philippi's list, neither is it taken up in Walper's Annales, and the sixth volume of Gay's Flora Chilena, which contains the grasses, was published two years before Steudel's Gramineæ. Desvaux, who elaborated

the grasses for Gay's work, cites Bertero's No. 117 under his *Bromus stamineus*, while the other numbers do not appear to be cited at all, at least not under the genus *Bromus* or *Festuca*, where one would expect to find them. Steudel does not give any reason for using the specific name he has given this plant, but the inference is that it is the popular name, yet it is not among those given in the last volume of Gay's Flora. It may be a diminutive of *cebada*, barley, grain; though on turning to a dictionary the only English equivalent of *cebadilla* given is "powder of hellebore"! We suspect this is one of the forms of the common *Bromus unioloides*. *Cebadilla* is the name in Central America of the fruits of *Schœnocaulon officinale*, A. Gray, a Melanthaceous plant.

Hordeum nodosum, Linn.

Hordeum nodosum, Linn., Sp. Pl., ed. 1, p. 126; Benth., Fl. Austr., vii. p. 669.
Hordeum pratense, Hudson, Fl. Anglica, ed. 2, p. 56; Kunth, Enum. Pl., i. p. 455.
Hordeum secalinum, Schreber, Spic., p. 148; Gay, Fl. Chil., vi. p. 458 (var. *chilense ?*).
Hordeum pusillum, Nutt., Gen. N. Am. Pl., i. p. 87.

JUAN FERNANDEZ. *Cuming; Philippi.*

The variety of this widely spread plant found in Juan Fernandez has a very slender inflorescence, and is quite like one found in Mendoza, Buenos Ayres, and Uruguay. Mr Moseley collected *Hordeum murinum*, Linn., in the island.

Chusquea fernandeziana, Philippi.

Chusquea fernandeziana, Philippi, Descr. Nuevas Plantas, 1873, p. 101.
Chusquea ligulata, Munro in Trans. Linn. Soc. Lond., xxvi. p. 62, *partim.*
Arundo quila, Molina? Bertero MS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Woods and thickets in the higher mountains—*Bertero; Reed; Moseley.*

The genus *Chusquea* is restricted to America and the West Indies, and comprises about thirty species, ranging from Mexico to Chili.

CRYPTOGAMÆ.—VASCULARES.

FILICES.

GLEICHENIACEÆ.

Gleichenia cryptocarpa, Hook.

Gleichenia cryptocarpa, Hook., Sp. Fil., i. p. 7, t. 6.
Gleichenia (Mertensia) cryptocarpa, Hook. and Bak., Synopsis Fil., p. 13.
Mertensia cryptocarpa, Gay, Fl. Chil., vi. p. 539; Philippi in Bot. Zeit., 1856, p. 631.

JUAN FERNANDEZ. *Philippi.*

A common Chilian species, occurring also to the southward, and in the Falkland Islands. The only evidence of this genus being represented in Juan Fernandez that we

have seen, is a small specimen of *Gleichenia revoluta*, H. B. K., collected by Mr Moseley—a species so distinct from the present that it is very unlikely Philippi can have been mistaken. It is remarkable as being the only vascular plant recorded from both Juan Fernandez and the Falklands.

Gleichenia revoluta, H. B. K.

Gleichenia revoluta, H. B. K., Nov. Gen. et Sp., i. p. 29; Hook., Sp. Fil., i. p. 7, t. 7.
Gleichenia (*Mertensia*) *revoluta*, Hook. and Bak., Synopsis Fil., p. 13.
Mertensia pruinosa, Mart., Ic. Crypt. Bras., p. 109.

Juan Fernandez. *Moseley; Downton.*

A common species in South America, ranging from New Grenada and Brazil to Chili and Chiloe.

POLYPODIACEÆ.

Thyrsopteris elegans, Kunze.

Thyrsopteris elegans, Kunze in Linnæa, ix. p. 506, et Farrnkräuter, p. 3, t. 1; Hook., Sp. Fil., i. p. 65; Hook. and Bak., Synopsis Fil., p. 16, t. 1, fig. 3; Gay, Fl. Chil., vi. p. 526.
Panicularia berteri, Colla in Mem. Accad. Sc. Torino, xxxix. p. 35, t. 64.

Juan Fernandez.—Endemic. Moist shady woods in the higher mountains—*Bertero; Reed; Moseley; Downton.*

It is noteworthy that this very striking fern was not collected by any of the earlier travellers, whose collections are at Kew, except Bertero. A living plant of it exists at Kew.

Alsophila pruinata, Kaulf.

Alsophila pruinata, Kaulf.; Hook., Sp. Fil., i. p. 47; Mett., Fil. Hort. Bot. Lips., p. 110; Hook. and Bak., Synopsis Fil., p. 38; Gay, Fl. Chil., vi. p. 525.
Polypodium pruinatum, Swartz, Fl. Ind. Occ., iii. p. 1682.
Polypodium griseum, Schkuhr, Fil., t. 25.
Lophosoria affinis et *Lophosoria discolor*, Presl, die Gefässbündel im Stipes der Farrn, p. 37.
Trichosorus glaucescens et *frigidus*, Liebm., *fide* Hook. MSS.
Cyathea discolor, Bory in Duperr. Voyage, Bot. Crypt., p. 281.

Juan Fernandez.—Woods in the hills and mountains—*Bertero; Scouler; Philippi; Moseley; Downton.*

A very common American fern, ranging from Mexico and the West Indies to Chili and South Brazil. In Juan Fernandez, according to Bertero, the stem is from three to eight feet high.

Dicksonia berteroana, Hook.

Dicksonia berteroana, Hook., Sp. Fil., i. p. 67, t. 23; Gay, Fl. Chil., vi. p. 522; Hook. and Bak., Synopsis Fil., p. 51.
Davallia berteroana, Colla in Mem. Accad. Sc. Torino, xxxix. p. 37, t. 65.
Balantium berteroanum, Kunze, Anal. Pteridogr., p. 40.

Juan Fernandez.—Endemic. In dense woods of the higher mountains—*Bertero; Philippi; Reed; Moseley; Downton.*

Brackenridge (U. S. Expl. Exped., xvi. p. 277) referred a Fiji fern to this, which Mettenius afterwards described (Ann. Sci. Nat., sér. 4, xv. p. 81) as an independent species; hence the more extended geographical area given to *Dicksonia berteroana* in some works.

Hymenophyllum cruentum, Cav.

Hymenophyllum cruentum, Cav.; Hook., Sp. Fil., i. p. 87, t. 31; Hook. and Bak., Synopsis Fil., p. 56; Gay, Fl. Chil., vi. p. 527.
Hymenoglossum, Presl.

Juan Fernandez. *Reed; Philippi; Moseley; Downton.*

A very marked species, occurring in Chili and Patagonia.

Hymenophyllum dichotomum, Cav.

Hymenophyllum dichotomum, Cav., Præl., n. 688, ex Hook., Sp. Fil., i. p. 98, t. 36; Hook. and Bak., Synopsis Fil., p. 70; Gay, Fl. Chil., vi. p. 530.
Hymenophyllum nigricans, Colla in Mem. Accad. Sc. Torino, xxxix. p. 32, t. 62.
Hymenophyllum plicatum, Kaulf., Enum. Fil., p. 268.

Juan Fernandez.—On the roots of trees in shady woods of the higher mountains—*Bertero; Sainthill; Reed; Moseley.* Masafuera.—*Reed.*

Also in South Chili.

Hymenophyllum fuciforme, Swartz.

Hymenophyllum fuciforme, Swartz, Synopsis Fil., p. 148; Hook., Sp. Fil., i. p. 103, t. 36; Hook. and Bak., Synopsis Fil., p. 62; Gay, Fl. Chil., vi. p. 533.
Hymenophyllum fucoides, Cav., Præl., n. 686, non Swartz.
Hymenophyllum semiteres, Colla in Mem. Accad. Sc. Torino, xxxix. p. 32, t. 61.

Juan Fernandez.—On the trunks of trees in the mountain woods—*Bertero; Reed; Moseley; Downton.*

A very striking species, with fronds sometimes as much as three feet high. It also grows in Valdivia and in Chiloe, and somewhat recently it was found at Port Otway by Dr R. O. Cunningham of H.M.S. "Nassau."

Hymenophyllum polyanthos, Swartz.

Hymenophyllum polyanthos, Swartz, Synopsis Fil., p. 149; Hook., Sp. Fil., i. p. 106; Hook. and Bak., Synopsis Fil., p. 60; Hook. f., Handb. Fl. N. Zeal., p. 354; Gay, Fl. Chil., vi. p. 532.

Juan Fernandez. *Bertero; Reed; Moseley; Downton.*

This is very widely diffused in tropical and subtropical countries, and extends into some temperate regions; yet, though abundant in New Zealand, it has not hitherto been found in Australia, nor is it known to occur in South Africa.

Hymenophyllum rarum R. Br.

Hymenophyllum rarum, R. Br., Prodr. Fl. Nov. Holl., p. 159; Benth., Fl. Austr., vii. p. 705; Hook. f., Handb. Fl. N. Zeal., p. 353; Hook., Sp. Fil., i. p. 101; Hook. and Bak., Synopsis Fil., p. 58.
Hymenophyllum cuneatum, Kunze, Anal. Pteridogr., p. 50, et Farrnkräuter, p. 186, t. 78; Gay, Fl. Chil., vi. p. 535.
Hymenophyllum bivalve, Hook. and Grev., Ic. Fil., t. 83.

Juan Fernandez. *Philippi; Reed.*

This species inhabits Chili, New Zealand, the Auckland Islands, Tasmania, South Africa, and Mauritius.

Hymenophyllum reniforme, Hook.

Hymenophyllum reniforme, Hook., Sp. Fil., i. p. 110, t. 38; Hook. and Bak., Synopsis Fil., p. 59; Gay, Fl. Chil., vi. p. 534; Philippi in Bot. Zeit., 1856, p. 631 (errore *uniforme*).

Juan Fernandez. *Gay; Philippi.*

Of this very distinct species, the only specimens in Kew Herbarium are from Northern Peru and the Andes of Quito in Ecuador, hence there is some doubt about its being a native of Juan Fernandez. Philippi does not state whether he had seen specimens, or whether he copied Gay.

Hymenophyllum subtilissimum, Kunze.

Hymenophyllum subtilissimum, Kunze, Anal. Pteridogr., p. 50, et Farrnkräuter, p. 187; Hook. and Bak., Synopsis Fil., ed. 2, p. 64.
Hymenophyllum berteroi, Hook., Sp. Fil., i. p. 64, t. 33; Gay, Fl. Chil., vi. p. 534.
Hymenophyllum æruginosum β, Hook., Sp. Fil., i. p. 94, t. 34.
Hymenophyllum franklinianum, Colenso; Hook. and Bak., Synopsis Fil., ed. 1, p. 64.
Hymenophyllum ferrugineum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 30.

Juan Fernandez. — On rocks and roots of trees in the shady woods of the higher mountains—*Bertero; Reed; Philippi; Moseley; Downton.*

Extratropical South America, and New Zealand.

In Hooker's Handbook of the Flora of New Zealand this is retained as a variety of *Hymenophyllum æruginosum*, Carm., a Tristan da Cunha plant, which is certainly very near it; but we have here followed the Synopsis Filicum. Plate XXXVIII. is a good representation of the Tristan da Cunha plant.

The inscription on Bertero's label with this species corresponds exactly to that cited by Colla under his *Hymenophyllum ferrugineum*, and as the description agrees as well, we have no hesitation in classing it with this.

Hymenophyllum tortuosum, Hook. and Grev.

Hymenophyllum tortuosum, Hook. and Grev., Ic. Fil., t. 129; Hook., Sp. Fil., i. p. 99 (excl. syn. *Hymenophyllum nigricans*, Colla); Hook. and Bak., Synopsis Fil., p. 70.

JUAN FERNANDEZ. *Reed; Philippi; Downton.*

A common species in extratropical South America.

Hymenophyllum tunbridgense, Smith.

Hymenophyllum tunbridgense, Smith, Fl. Brit., p. 1141; Hook., Sp. Fil., i. p. 95; Hook. and Bak., Synopsis Fil., p. 67; Gay, Fl. Chil., vi. p. 530; Philippi in Bot. Zeit., 1856, p. 631.

JUAN FERNANDEZ. *Gay; Philippi.*

There are no Juan Fernandez specimens of this fern in Kew Herbarium, but as it is the most universally dispersed species of the genus, it is not unlikely to occur. The form having entire involucral valves (*β wilsoni*, Hook. and Bak.) is common in Chili.

Trichomanes dichotomum, Philippi.

Trichomanes dichotomum, Philippi in Bot. Zeit., 1856, p. 650.

JUAN FERNANDEZ. *Philippi.*

In the collection of Chilian and Juan Fernandez plants in the Kew Herbarium, purchased by Mr Reed in 1873, there is a specimen of this fern labelled "Valdivia," in the handwriting apparently of Philippi, though in the place cited the latter records it from Juan Fernandez, therefore its native country is a little uncertain.

Trichomanes exsectum, Kunze.

Trichomanes exsectum, Kunze, Anal. Pteridogr., p. 47, t. 29, fig. 2; Hook., Sp. Fil., i. p. 141; Hook. and Bak., Synopsis Fil., p. 85; Gay, Fl. Chil., vi. p. 537 (errore *exsertum*).

Hymenophyllum fuciforme, Colla in Mem. Accad. Sc. Torino, xxxix. p. 33, t. 63, non Swartz.

JUAN FERNANDEZ. — On rocks in dark shady places in the mountains — *Bertero; Cuming; Moseley.* MASAFUERA.—*Reed.*

Also a native of the neighbourhood of Valdivia and Chiloe.

Following the indication on Bertero's label, Colla published this as *Hymenophyllum fuciforme* of Swartz, while to Swartz's plant he gave the name of *Hymenophyllum semiteres*. In each case there is no difficulty in determining the species, independently of the exact copies of Bertero's labels which Colla gives.

Trichomanes pyxidiferum, Linn.

Trichomanes pyxidiferum, Linn., Sp. Pl., ed. 2, p. 1561; Hook., Sp. Fil., i. p. 124; Hook. and Grev., Ic. Fil., t. 206; Hook. and Bak., Synopsis Fil., p. 81.

JUAN FERNANDEZ. *Moseley.*

Common in America, from Mexico southward to Chili; in Tropical and South Africa, and in India; also occurring in North-Eastern Australia.

Adiantum æthiopicum, Linn.

Adiantum æthiopicum, Linn., Sp. Pl., ed. 2, p. 1560; Hook., Sp. Fil., ii. p. 37, t. 77; Hook. and Bak., Synopsis Fil., p. 123.
Adiantum chilense, Kaulf., Enum. Fil., p. 207; Hook., Sp. Fil., ii. p. 43, t. 75; Gay, Fl. Chil., vi. p. 485.

Juan Fernandez. *Bertero; Scouler; Moseley.*

As limited in the Synopsis Filicum, this species includes a number of distinct forms, connected probably by intermediate ones, and it is generally diffused in warm countries. The form that has been called *Adiantum chilense* ranges from California to Chili. In Hooker's Species Filicum it is retained as an independent species.

Pteris comans, Forster.

Pteris comans, Forster, Fl. Ins. Austr. Prodr., p. 79; Swartz, Synopsis Fil., pp. 98 et 292; Benth., Fl. Austr., vii. p. 733.
Pteris (Litobrochia) comans, Hook., Sp. Fil., ii. p. 219; Hook. and Bak., Synopsis Fil., p. 171.
Pteris berteroana, Agardh, Sp. Pterid., p. 66; Hook., Sp. Fil., ii. p. 219.
Litobrochia comans, Presl, Tent. Pteridogr., p. 149.
Pteris endlicheriana, Agardh, Sp. Pterid., p. 66; Hook., Ic. Pl., t. 973.

Juan Fernandez.—In shady woods—*Bertero; Cuming; Moseley.*

A variable fern, the extreme forms of which have been described as species, but they are connected by intermediate stages, and some of the New Zealand specimens are indistinguishable from the Juan Fernandez plant. It inhabits New Zealand, Australia, and Polynesia, but hitherto it has not been found in America.

Pteris chilensis, Desv.

Pteris chilensis, Desv.; Hook., Sp. Fil., ii. p. 175, t. 120; Hook. and Bak., Synopsis Fil., p. 161; Gay, Fl. Chil., vi. p. 488.
Pteris tenera, Kaulf., Enum. Fil., p. 191; Colla in Mem. Accad. Sc. Torino, xxxix. p. 38.
Pteris fernandeziana, Philippi in Linnæa, xxix. p. 105.

Juan Fernandez.—Dense woods on the mountains—*Bertero; Cuming; Reed.*

Not uncommon in Chili.

Philippi's *Pteris fernandeziana*, of which there is an authentically named specimen at Kew, cannot be distinguished even as a variety.

Pteris incisa, Thunb.

Pteris incisa, Thunb., Prodr. Fl. Cap., p. 733; Hook., Sp. Fil., ii. p. 230; Hook. and Bak., Synopsis Fil., p. 172; Benth., Fl. Austr., vii. p. 732.
Litobrochia incisa et *Litobrochia vespertilionis*, Presl, Tent. Pteridogr., p. 149.
Pteris vespertilionis, Labill., Pl. Nov. Holl., ii. p. 96, t. 245.
Litobrochia appendiculata, Gay, Fl. Chil., vi. p. 491, non Kaulf.
Pteris flavescens, Colla in Mem. Accad. Sc. Torino, xxxix. p. 37.

Juan Fernandez.—In woods and along the banks of streams in the hills—*Bertero; Scouler; Douglas; Cuming; Reed; Moseley.*

Widely diffused in tropical and southern extratropical countries, and one of the commonest plants in Juan Fernandez.

[Gay, Fl. Chil., vi. pp. 490, 491, includes *Pteris patens*, Kunze (Anal. Pteridogr., p. 28), which is doubtless a form of *Pteris incisa*, Thunb., and *Litobrochia decurrens*, Presl, a well-marked species only known to us from Brazil.]

Pteris marattiæfolia, Hook.

Pteris marattiæfolia, Hook., Sp. Fil., ii. p. 177, t. 122; Hook. and Bak., Synopsis Fil., p. 157.
Pteris semiadnata, Philippi in Linnæa, xxix. p. 106.

Juan Fernandez. *Philippi.*

There are no specimens of this fern from Juan Fernandez at Kew, and it is probable that Philippi's record in the Linnæa was a mistake, for there is a specimen at Kew direct from him of his *Pteris semiadnata*, labelled "Valdivia." The other specimens are from Chiloe, Cordillera de la Costa, and Cordillera de Ranco. In the same place as the *Pteris*, Philippi published the very marked new *Trichomanes dichotoma*, and cited Juan Fernandez as its native country; but that also he sent to Kew labelled "Valdivia."

Lomaria attenuata, Willd.

Lomaria attenuata, Willd., Sp. Pl., v. p. 290; Hook., Sp. Fil., iii. p. 6; Hook. and Bak., Synopsis Fil., p. 176; Hook. f., Handb. Fl. N. Zeal., p. 368; Benth., Fl. Austr., vii. p. 736.
Blechnum attenuatum, Mett., Fil. Hort. Lips., p. 64, t. 3.
Lomaria fernandeziana, Philippi, Descr. Nuevas Plantas, 1873, p. 105.
Lomaria bella, Philippi in Linnæa, xxix. p. 104.
Lomaria acuminata, Philippi MSS. in Herb. Kew.
Lomaria schottii, Colla in Mem. Accad. Sc. Torino, xxxix. p. 44, t. 72.

Juan Fernandez.—In dense woods of the higher mountains—*Bertero; Douglas; Philippi; Reed; Moseley; Downton.*

Very widely diffused in tropical and southern extratropical countries; but within the limits of Hooker's Handbook of the New Zealand Flora, it is only known to occur in the Kermadec Islands, and only in Lord Howe Island within the limits of Bentham's Flora Australiensis. *Lomaria bella*, Philippi, is a pretty variety, with a deep red stipes and midrib.

Lomaria blechnoides, Bory.

Lomaria blechnoides, Bory in Duperr. Voyage, Bot. Crypt., p. 273; Hook., Sp. Fil., iii. p. 11; Hook. and Bak., Synopsis Fil., p. 177; Gay, Fl. Chil., vi. p. 481; Philippi in Bot. Zeit., 1856, p. 630.
Blechnum lomarioides, Mett., Fil. Lechl., p. 14.

Juan Fernandez. *Philippi; Reed.*

Philippi states that this species is common in Chili, but we have only seen it from the

province of Valdivia and Chiloe. Among Mr Reed's specimens from Juan Fernandez, is a very singular, stoloniferous variety on which the contiguous pinnules are twice as long as broad. Allied to the Australasian and Polynesian *Lomaria lanceolata.*

Lomaria lherminieri, Bory.

Lomaria lherminieri, Bory; Hook., Sp. Fil., iii. p. 9; Hook. and Bak., Synopsis Fil., p. 176; Hook.' Gard. Ferns, t. 40; Kunze, Farrnkräuter, p. 173, t. 73.
Lomaria lanceolata, Spreng.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 45.
Blechnum lherminieri, Mett., Fil. Hort. Lips., p. 64, t. 4.

Juan Fernandez.—On the roots of trees on the hills—*Bertero; Moseley.*

This species ranges from the West Indies and New Grenada southward to Chili, and on the authority of Hooker and Baker, it scarcely differs from the Australian and Polynesian *Lomaria lanceolata.*

Lomaria alpina, Spreng.

Lomaria alpina, Spreng., Syst. Veg., iv. p. 62; Hook. and Bak., Synopsis Fil., p. 178; Hook., Sp. Fil., iii. p. 16.
Lomaria pennamarina, Mett.; Kuhn, Fil. Afr., p. 92; Baker in Mart. Fl. Bras. Polypod., fasc. xlix., p. 414.
Lomaria gayana, Fée in Gay Fl. Chil., vi. p. 481, et Fougères, 7ième Mém., p. 25, t. 10, fig. 1.
Blechnum parvulum, Philippi, Descr. Nuevas Plantas, 1873, p. 104.

Juan Fernandez. *Sainthill.*

Widely dispersed in south temperate regions, except South Africa. For more extended synonymy and further particulars of this species see the Report on the Botany of the Tristan da Cunha group in Part II., p. 164, of this Work.

Mr Sainthill's specimen, referred to this species by Mr Baker, answers quite well to Philippi's description of his *Blechnum parvulum,* and is apparently nothing more than an abnormal state of *Lomaria alpina.* Similar blechnoid conditions of *Lomaria* are not uncommon.

Lomaria boryana, Willd.

Lomaria boryana, Willd., Sp. Pl., v. p. 292; Hook. and Bak., Synopsis Fil., p. 180.
Lomaria magellanica, Desv. in Mém. Soc. Linn. Par., vi. p. 289; Hook., Sp. Fil., iii. p. 26; Hook. f., Fl. Antarct., p. 393; Gay, Fl. Chil., vi. p. 480.
Blechnum magellanicum, Mett., Fil. Lechl., p. 14.
Lomaria cycadifolia, Colla in Mem. Accad. Sc. Torino, xxxix. p. 43, t. 71.
Blechnum cycadifolium, Sturm, Enum. Fil. Chil., p. 23.
Lomaria lanuginosa, Kunze, Anal. Pteridogr., p. 19; Gay, Fl. Chil., vi. p. 479.

Juan Fernandez. In the mountain woods—*Bertero; Moseley; Downton.*

A very common fern in America, from the West Indies southward to the Strait of Magellan and the Falkland Islands; also common in South Africa, and occurring in

Tropical Africa, Madagascar, and Mauritius; and a very striking form that grows in the Tristan da Cunha group is referred to this species. It has not been found in Asia, Australia, or New Zealand.

Lomaria capensis, Willd.

Lomaria capensis, Willd., Sp. Pl., v. p. 291; Benth., Fl. Austr., vii. p. 737.
Osmunda capensis, Linn., Mant., p. 306.
Lomaria procera, Sprengel, Syst. Veg., iv. p. 65; Hook., Sp. Fil., iii. p. 22; Hook. and Bak., Synopsis Fil., p. 179; Hook., Ic. Pl., tt. 427, 428; Hook., Garden Ferns, t. 53.
Lomaria gilliesii, Hook. and Grev., Ic. Fil., t. 207.
Lomaria chilensis, Kaulf., Enum. Fil., p. 154; Gay, Fl. Chil., vi. p. 480.
Lomaria reedei, Philippi, Descr. Nuevas Plantas, 1873, p. 105?
Blechnum chilense, Mettenius, Fil. Lechl., p. 11.

Juan Fernandez. *Scouler; Moseley.*

Widely dispersed in tropical and southern extratropical countries, though it is wanting in St Helena, Tristan da Cunha, and other islands already dealt with in this work. On the other hand, it is abundant in New Zealand and the outlying Campbell and Kermadec Islands. We have doubtfully reduced Philippi's *Lomaria reedei* to this species from the description alone.

Blechnum australe, Linn.

Blechnum australe, Linn., Mant., p. 130; Hook., Sp. Fil., iii. p. 56; Hook. and Bak., Synopsis Fil., p. 186; Mett. in Reise der Novara, Bot., i. p. 208; Baker in Mart. Fl. Bras., fasc. xlix., p. 420.
Blechnum hastatum, Kaulf., Enum. Fil., p. 161; Hook., Sp. Fil., iii. p. 57; Hook. and Bak., Synopsis Fil., p. 185; Gay, Fl. Chil., vi. p. 477.
Lomaria hastata, Kunze, Farrnkräuter, p. 119, t. 55, fig. 1.
Blechnum pubescens, Hook., Ic. Pl., t. 97; Gay, Fl. Chil., vi. p. 478.
Lomaria pubescens, Kunze, Farrnkräuter, p. 122, t. 55, fig. 2.

Juan Fernandez.—Apparently very common in the islands, being in every collection from the early ones of Scouler and Bertero down to Moseley's, the last received.

This fern inhabits Madagascar, Bourbon, South Africa, the islands of St Paul, Amsterdam, and the Tristan da Cunha group, and is also common in temperate South America. In Hooker and Baker's Synopsis Filicum, *Blechnum hastatum* is retained as an independent species for the South American plant, but it is impossible to distinguish the African from it.

Asplenium lunulatum, Swartz.

Asplenium lunulatum, Swartz, Synopsis Fil., p. 80; Hook. and Bak., Synopsis Fil., p. 202.
Asplenium erectum, Bory in Willd. Sp. Pl., v. p. 328; Hook., Sp. Fil., iii. p. 126.
Asplenium fernandezianum, Kunze, Anal. Pteridogr., p. 22; Gay, Fl. Chil., vi. p. 503.
Asplenium alatum, Humb.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 40, t. 69.

Juan Fernandez.—Shady woods in the higher mountains — *Bertero; Douglas; Cuming; Reed; Moseley; Downton.*

Almost universally spread in the tropics, and extending into some temperate regions, but absent from Australia and New Zealand. Among other oceanic islands it inhabits Ascension, St Helena, and Tristan da Cunha. The insular form is commonly proliferous.

Asplenium macrosorum, Bertero.

Asplenium macrosorum, Bertero; Colla in Mem. Accad. Sc. Torino, xxxix., p. 39, t. 67; Mett., Aspl., p. 126; Hook., Sp. Fil., iii. p. 93, t. 176; Hook. and Bak., Synopsis Fil., p. 206; Gay, Fl. Chil., vi. p. 500.

JUAN FERNANDEZ.—Endemic. On trunks of trees in the dense woods of the higher mountains—*Bertero; Philippi; Reed; Downton.*

This is one of the small number of ferns endemic in Juan Fernandez; it resembles the St Helena *Asplenium platybasis*, having fewer, larger, and more distinct sori.

Asplenium magellanicum, Kaulf.

Asplenium magellanicum, Kaulf., Enum. Fil., p. 175; Hook. and Grev., Ic. Fil., t. 180; Hook., Sp. Fil., iii. p. 177; Hook. and Bak., Synopsis Fil., p. 213; Gay, Fl. Chil., vi. p. 504.

JUAN FERNANDEZ.—On rocks along mountain streams—*Bertero; Reed; Moseley; Sainthill.* MASAFUERA.—*Cuming; Downton.*

From Tierra del Fuego northward to the Chilian Andes.

Asplenium obtusatum, Forst.

Asplenium obtusatum, Forst., Fl. Ins. Austr. Prodr., p. 80; Hook., Sp. Fil., iii. p. 96; Hook. and Bak., Synopsis Fil., p. 207; Benth., Fl. Austr., vii. p. 747; Hook., Fil. Exot., t. 46; Labill., Pl. Nov. Holl., ii. p. 93, t. 242; Hook. f., Handb. Fl. N. Zeal., p. 371.
Asplenium obliquum et *Asplenium lucidum*, Forst., Fl. Ins. Austr. Prodr., p. 80.
Asplenium chondrophyllum, Bertero, ex Colla in Mem. Accad. Sc. Torino, xxxix. p. 40, t. 68.
Asplenium consimile, Gay, Fl. Chil., vi. p. 501.

JUAN FERNANDEZ.—Maritime rocks at Pangual and English Bay—*Bertero; Reed.* MASAFUERA.—*Cuming.*

A native of Peru, Chili, Polynesia, Australia, New Zealand, the Crozets, Tristan da Cunha group, and the Sandwich Islands. Besides the Oceanic Islands named it also inhabits Easter Island, where Mr Sainthill collected it about the year 1867. In New Zealand it is exceedingly common, and presents a great range of variation.

Aspidium aculeatum, Swartz.

Aspidium aculeatum, Swartz, Synopsis Fil., p. 53; Baker in Mart. Fl. Bras., fasc. xlix., p. 462, t. 45.
Aspidium lobatum et *Aspidium vestitum*, Swartz, Synopsis Fil., pp. 53, 254; Gay, Fl. Chil., vi. p. 516.
Aspidium (*Polystichum*) *aculeatum*, Hook., Sp. Fil., iv. p. 18; Hook. and Bak., Synopsis Fil., p. 252.
Aspidium aculeatum, Swartz, var. *vestitum*, Hook. f., Handb. Fl. N. Zeal., p. 375.

JUAN FERNANDEZ.—Shady woods in the higher mountains—*Bertero; Scouler; Douglas; Cuming; Reed; Moseley; Downton.*

This is perhaps the commonest of all ferns, being spread over nearly the whole area of fern distribution; it is more general than *Pteris aquilina*, but unlike that it does not grow socially, covering large tracts. Yet, common as *Pteris aquilina* is, it is not found in any of our insular floras except that of the Bermudas.

Aspidium aculeatum presents an infinite variety of forms, from a few inches to several feet high, and equally diverse in the degree of cutting of the frond. The Juan Fernandez plant is a common southern form remarkable for the copious brown scales on the rachis.

Aspidium capense, Willd.

Aspidium capense, Willd., Sp. Pl., v. p. 267; Baker in Mart. Fl. Bras., fasc. xlix., p. 463, t. 29 (sub titulo *Swartziano*); Lowe, Fil., vi. t. 46.
Aspidium coriaceum, Swartz, Synopsis Fil., p. 57.
Aspidium (*Polystichum*) *coriaceum*, Hook., Sp. Fil., iv. p. 32.
Polystichum coriaceum, Gay, Fl. Chil., vi. p. 513; Philippi in Bot. Zeit., 1856, p. 631.

Juan Fernandez. *Scouler; Philippi.*

Generally spread in tropical and southern extratropical countries, including St Paul Island and Tristan da Cunha.

We have seen only one specimen from Juan Fernandez, and that was collected by Scouler in 1828.

Aspidium flexum, Kunze.

Aspidium flexum, Kunze, Anal. Pteridogr., p. 44.
Polystichum flexum, Gay, Fl. Chil., vi. p. 517.
Aspidium (*Polystichum*) *flexum*, Hook. and Bak., Synopsis Fil., p. 255.
Aspidium berterianum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 42, t. 70; Hook., Sp. Fil., iv. p. 33 (*berteroanum*).

Juan Fernandez.—Endemic. On rocks and roots of trees in the mountain woods—*Bertero; Scouler; Cuming; Douglas; Reed; Moseley; Downton.*

Nephrodium (Lastrea) villosum, Hook.

Nephrodium (*Lastrea*) *villosum*, Hook., Sp. Fil., iv. p. 134, t. 264; Hook. and Bak., Synopsis Fil., p. 286.
Aspidium villosum, Swartz, Synopsis Fil., p. 56.
Polypodium (*Phegopteris*) *berteroanum*, Hook., Sp. Fil., iv. p. 269.

Juan Fernandez.—In shady woods—*Bertero; Douglas; Scouler; Reede; Philippi; Moseley.*

A very common fern in Peru and Chili, the indusium of which is commonly undeveloped, hence it has been partly referred to *Polypodium*. Philippi appears, from specimens in the Kew Herbarium named by him, to have mistaken the non-indusiate state for *Polypodium rugulosum*, a very distinct plant. *Nephrolepis altescandens* has a very fugacious indusium, and in consequence has also been referred to *Polypodium* by some authors.

Nephrolepis altescandens, Baker.

Nephrolepis altescandens, Baker in Hook. and Bak. Synopsis Fil., p. 301.
Polypodium altescandens, Colla in Mem. Accad. Sc. Torino, xxxix. p. 48; Hook., Sp. Fil., iv. p. 218.
Polypodium procurrens, Kunze, Anal. Pteridogr., p. 17; Gay, Fl. Chil., vi. p. 505.

JUAN FERNANDEZ. — Endemic. Climbing high on the trunks of trees — *Bertero; Philippi; Reed; Moseley.*

A near ally of *Nephrolepis ramosa*, which is widely spread in the warmer parts of the Old World.

Polypodium lanceolatum, Linn.

Polypodium lanceolatum, Linn., Sp. Pl., ed. 1, p. 1082; Hook. and Bak., Synopsis Fil., p. 356; Baker in Mart. Fl. Bras., fasc. xlix., p. 536, t. 32.
Polypodium peltatum, Cav.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 52.
Polypodium (Phymatodes) lepidotum, Willd.; Hook., Sp. Fil., v. p. 56.
Pleopeltis ensifolia, Hook., Exot. Fl., t. 62.

JUAN FERNANDEZ.—Creeping over the trunks of trees—*Bertero; Reede; Philippi; Moseley.*

This is generally spread in tropical and subtropical South America, in tropical and South Africa; it also occurs in the Nilgherry Hills in India, in St Helena, and in the Sandwich Islands.

Polypodium punctatum, Thunb.

Polypodium punctatum, Thunb., Fl. Jap., p. 337; Hook. and Bak., Synopsis Fil., p. 312; Baker in Mart. Fl. Bras., fasc. xlix., p. 503.
Phegopteris rugulosa, Fée; Gay, Fl. Chil., vi. p. 507.
Polypodium rugulosum, Labill., Pl. Nov. Holl., ii. p. 92, t. 241.
Polypodium spectabile, Kaulf., Enum. Fil., p. 121.
Phegopteris spectabilis, Fée; Gay, Fl. Chil., vi. p. 507.

JUAN FERNANDEZ.—On the banks of streams in woods in the hills—*Bertero; Cuming.*

Widely spread in tropical and subtropical regions in both hemispheres, and extending into south temperate regions, though hitherto not found in New Zealand. It grows in the Tristan da Cunha group, as well as in St Helena.

Polypodium translucens, Kunze. (Plate LXIII.)

Polypodium translucens, Kunze, Anal. Pteridogr., p. 16.
Goniophlebium translucens, Fée; Gay, Fl. Chil., vi. p. 509.
Polypodium (Goniophlebium) translucens, Hook., Sp. Fil., v. p. 22; Hook. and Bak., Synopsis Fil., p. 342.
Polypodium intermedium, Colla in Mem. Accad. Sc. Torino, xxxix. p. 51, t. 74.
Polypodium californicum, Mett., Polyp., p. 71, non Kaulf.

JUAN FERNANDEZ.—Endemic—*Bertero; Douglas; Cuming; Reede; Moseley; Downton.*

From specimens collected by Mr Downton, and lately presented to the Kew Herbarium by Messrs Veitch, of Chelsea, this species is evidently very variable in the division of the fronds. The ordinary form, like the ordinary form of *Polypodium vulgare*, is simply pinnatifid; there is also a form corresponding to *Polypodium vulgare*, var. *cambricum*, and there are forms with bipinnatifid and almost tripinnatifid fronds, as represented in our Plate.

Polypodium masafueræ, Philippi.

Polypodium masafueræ, Philippi in Linnæa, xxix. p. 107.

Masafuera.—Endemic. *Philippi.*

Philippi compares this with a plant which he found on the shore of the Desert of Atacama, and which he proposed naming *Polypodium squamatum;* but that name is occupied by a Linnæan species. There is a specimen of the Atacama plant in the Kew Herbarium, and it is apparently a distinct species allied to *Polypodium plebeium.*

Gymnogramme (Selliguea) elongata, Hook.

Gymnogramme (Selliguea) elongata, Hook., Sp. Fil., v. p. 157; Hook. and Bak., Synopsis Fil., p. 387; Baker in Mart. Fl. Bras., fasc. xlix., p. 557.
Grammitis elongata, Swartz, Synop. Fil., p. 22.
Drynaria elongata, Fée, Gen. Fil., p. 271; Gay, Fl. Chil., vi. p. 512.
Synammia elongata, Presl, Tent. Pteridogr., p. 212.
Pleopeltis elongata, Kaulf., Enum. Fil., p. 246.
Polypodium elongatum, Mett., Polyp., p. 88.
Grammitis lanceolata, Schkuhr, Fil., p. 9, t. 7.

Juan Fernandez. *Gay.*

Cuba and Mexico to Brazil and Chili.

Although this is specially recorded in the Synopsis Filicum from Juan Fernandez, we have seen no specimen from the island in the Kew Herbarium, possibly because the sheet to which it was attached had been taken out for the purpose of attaching other specimens.

Nothochlæna chilensis, Hook.

Nothochlæna chilensis, Hook., Sp. Fil., v. p. 112, t. 286; Hook. and Bak., Synopsis Fil., p. 374.
Cincinnalis chilensis, Fée; Gay, Fl. Chil., vi. p. 497.

Juan Fernandez.—Endemic. On rocks in hot situations—*Bertero; Moseley.*

We have seen only one specimen of this plant, collected by Bertero, and two very stunted ones, by Moseley. It is closely allied to *Nothochlæna nivea*, a native of the Andes from Mexico to Peru.

CRYPTOGAMÆ.—CELLULARES.[1]

MUSCI.[2]

Oncophorus (Rhabdoweisia) cyathicarpus, Mitt.

Rhabdoweisia cyathicarpa, Mitt. in Journ. Linn. Soc. Lond., xii. p. 54.
Zygodon cyathicarpus, Montagne in Ann. Sc. Nat., ser. 3, iv. p. 106, Syll. Crypt., p. 37; Gay, Fl. Chil. Atl., t. 3, fig. 1; C. Müll., Synopsis Musc. Frond., i. p. 682.
Gymnostomum linearifolium, Tayl. in Hook. Lond. Journ. Bot., 1846, p. 42.

JUAN FERNANDEZ. *Moseley.*

Originally described from Chili, this moss has been gathered in the Andes of Quito by Jameson and Spruce, in the Bogotian Andes by Weir; in Africa it is found in the mountains of Abyssinia; in the Atlantic Islands it is the *Zygodon curvipes*, C. Müll., who describes it as dicœcious, but numerous Madeiran specimens are all moncœcious. Schimper named it "*Amphoridium canariense.*" It is found also at the Cape of Good Hope, in Tasmania and Australia, and has thus a wider distribution in the southern hemisphere than *Oncophorus lapponicus*, the corresponding species of the northern regions. These mosses, together with the *Oncophorus mougeotii* and *Oncophorus californicus*, Hampe, of which *Amphoridium cæspitosum*, Mitt. (Journ. Linn. Soc. Lond., viii.), is probably a synonym, have been considered to be related to *Zygodon*, but their closest analogy is with the *Rhabdoweisiæ*, from which they simply differ in being nearly or quite destitute of a peristome.

Oncophorus (Rhabdoweisia) striatus, Mitt.

Oncophorus striatus, Lindb.; Braithw., Brit. Moss Fl., p. 172, t. 26.
Grimmia striata, Schrad., Bot. Journ., ii. p. 55.

JUAN FERNANDEZ. *Moseley.*

Intermixed with *Mielichhoferia.* It is probably cosmopolitan.

Dicranum billardieri, Schwägr.

Dicranum billardieri, Schwägr.; Suppl., ii. p. 70, t. 121; C. Müll., Synopsis Musc. Frond., i. p. 368.
Dicranum truncorum, Schimp.; C. Müll. in Bot. Zeit., 1859, p. 215.

JUAN FERNANDEZ.—Without fruit—*Moseley;* in abundance in the same condition—*Mr W. Saunders' collector.*

It is present in most collections made in Chili and in Fuegia.

[1] See *ante*, p. 6 *et seq.*, for List of Cellular Cryptogams collected by Bertero.
[2] By William Mitten, Esq., A.L.S.

Campylopus (Thysanomitrium) leptodus, Mitt.

Campylopus leptodus, Montagne, Syll. Crypt., p. 43; Gay, Fl. Chil. Atl., vii. p. 174, t. 3, fig. 3.

Juan Fernandez. *Moseley.*

This well-marked species seems confined to the western side of South America, extending from the Quitinian Andes to South Chili; it also occurs in New Zealand and in the Auckland Islands.

Glyphomitrium fernandezianum, Mitt.

Glyphomitrium fernandezianum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 107.

Juan Fernandez.—In fruit, but the capsules mostly broken off—*Moseley.* It had before been gathered by Bertero and Cuming.

The genus is not yet well represented by specimens from the Chilian coasts.

Macromitrium saxatile, Mitt.

Macromitrium saxatile, Mitt. in Journ. Linn. Soc. Lond., xii. p. 200.

Juan Fernandez.—On rocks in shady places in the hills—*Bertero.*

Zygodon obovalis, Mitt., n. sp.

Dioicus, pusillus, folia patentia, oblongo-linearia, apice breviter acuminata acutave, nervo latiusculo infra apicem evanescente carinata, cellulis parvis rotundis obscuris parietibus latis pellucidis. Theca obovato plicata ore satis parvo peristomio? ciliis 8.

Caulis 5–6 mm. altus. Folia ramea 1 mm.; comalia 1·50 mm. longa, luteo-viridia, sicca contorta. Seta 4 mm. longa. Theca cum collo vix 1 mm.

Juan Fernandez.—Amongst *Leptodon smithii—Mr W. Saunders' collector.*[1]

Similar to *Zygodon coralensis* and *Zygodon krausei*, Lorentz, from Valdivia, but different in its areolation of smaller cells, with wider interspaces, and with capsules in form like those of the European *Zygodon viridissimus.*

Funaria hygrometrica, Linn.

Funaria hygrometrica, Linn.; Hedw., Sp. Musc., p. 172; C. Müll., Synopsis Musc. Frond., i. p. 107.

Juan Fernandez.

Found in all parts of the world.

[1] A number of mosses and *Hepaticæ* were picked out of moss used to pack living plants sent by one of Mr W. Wilson Saunders' collectors from Juan Fernandez.—W. M.

Mielichhoferia longiseta, C. Müll.

Mielichhoferia longiseta, C. Müll., Synopsis Musc. Frond., i. p. 236 ; Mitt. in Journ. Linn. Soc. Lond., xii. p. 321.

Juan Fernandez. *Moseley.*

Andes of Peru and Ecuador, at altitudes of 10,000 to 11,000 feet.

Rhacopilum tomentosum, Brid.

Rhacopilum tomentosum, Brid., Bryol. Univ., ii. p. 719 ; Mitt. in Journ. Linn. Soc. Lond., xii. p. 333.
Hypnum tomentosum, Hedw., Musc. Frond., iv. p. 48, t. 19.
Hypopterygium tomentosum, C. Müll., Synopsis Musc. Frond., ii. p. 12.

Juan Fernandez.—In young fruit—*Moseley.* It was also gathered in abundance by Mr W. Saunders' collector, and lived for some years as a weed in Mr Mitten's garden on the earth under ferns, but did not fruit.

West Indies and Equinoctial America.

Lepidopilum splendidissimum, Mitt.

Lepidopilum splendidissimum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 378.
Hookeria splendidissima, Montagne in Ann. Sc. Nat., sér. 2, iv. p. 97 ; C. Müll., Synopsis Musc. Frond., ii. p. 203 ; Schwägr., Suppl., iv. t. 320.

Juan Fernandez. *Bertero ; Moseley.*

Also in Chili and Peru.

This beautiful moss Montagne distributed under the name of *Lamprophyllum splendidissimum*, but it does not appear that any notice was taken of this name in his printed works.

Pterygophyllum denticulatum, Mitt.

Pterygophyllum denticulatum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 397.
Hookeria dentata, Hook. f. et Wils. in Hook. Lond. Journ. Bot., iii. p. 550 ; Hook. f., Fl. Antarct., in t. 62, fig. 2 (*denticulata*) ; C. Müll., Synopsis Musc. Frond., ii. p. 203.

Juan Fernandez.—Small blackened barren stems amongst moss—*Mr W. Saunders' collector.*

Also in Hermite, Falkland, and Auckland Islands.

In the representation cited of this species, fig. 4 represents the leaf of the medial series ; fig. 3, the intermedial. The oblong lateral leaf is not shown. It is double the length of the others, as is usual in the species of this and many other *Hookeria*. *Pterygophyllum*

anomalum (Schwägr., t. 278, *Rhacopilum*), has its leaves undulate at the margin, and, like some others of the genus, revives in water with difficulty. There are several undescribed species of this genus from Chili.[1]

Porotrichum (Thamnium) confertum, Mitt., n. sp.

Frons e ramis crassis densifoliis confertus ; folia imbricata, patentia, ovata, acuta, nervo infra apicem evanido, margine in ramea apice denticulata, celullis minutis oblongis densis.

JUAN FERNANDEZ.—A few stems all barren—*Moseley.*

Considerably different from *Porotrichum fasciculatum* in its branches not having the foliage compressed ; indeed, the whole look of the specimens is that of a greatly enlarged *Isothecium myurum.*

Porotrichum latinerve, Mitt., n. sp.

Folia in frondis medio erecto-patentia, subcompressa, lanceolata, apice latiuscule acuta, nervo lato ad apicem producto, margine subintegerrima ; ramea apice serrulata, nervo dorso dentato, cellulis parvis oblongis obscuriusculis areolata.

[1] *Pterygophyllum fragile*, Mitt., n. sp.—Caulis erectus ? apice arcuato-decurvus, simplex ; folia lateralia patenti-divergentia, obovato-spathulata, obtusa, ultra medium crasse nervata, margine dentibus approximatis ciliata, media intermediaque orbiculate ovata, e cellulis hexagonis areolata, fragilia, perichætialia parva, erecta, ovata, acuminata, convoluta ; theca in pedunculo elongato fusco oblonga, demum pendula, operculo rostrato, calyptra basi plurifida.

Caulis ? 2–3 cm. altus, simplex vel rarius divisus. Folia lateralia 3 mm. longa, 1·25 mm. lata, pellucida, fragillima, pallescentia. Pedunculus, 2 cm. longus, fuscus. Theca 2 cm. longa.—South Chili, Spencer and Reed.

There is also another smaller species from the same country.

Pterygophyllum sublimbatum, Mitt., n. sp.—Procumbens ; folia, lateralia, divergentia, oblonga, obovata, apice angulo lato acuta, ad medium nervata, media, intermediaque suborbiculata, omnia marginibus apicem versus denticulis brevibus serrata, paulo intensius fuscata, sublimbata.

Caulis ? 2–3 cm. longus, flaccidus. Folia 2 mm. longa, fusca, nigrescentia, cellulis parvis hexagonis areolata.

Volcan d'Osorno, South Chili.

And a very different one from the Chonos Archipelago, gathered by Darwin, *Pterygophyllum chonoticum*, Mitt., n. sp.

Caulis ? erectus, apice arcuato decurvus ; folia lateralia patentia, oblongo-spathulata, obtusa, media, intermediaque suborbiculata, omnia media tenue nervata, margine apicem versus dentibus ciliata. Caulis 3–5 cm. altus, simplex vel innovationibus divisus. Folia lateralia 3 mm. longa, ubi latiora 1·50 mm. lata, pallide fulva fuscescentia ; folia media intermediaque 2 mm. longa, 1·50 mm. lata.

One of the most distinct of the genus, its spathulate lateral leaves giving it a similarity to some *Gottscheæ*, which is increased by the fulvous colour. All the species of this group of mosses are but little known. Some appear to grow in a procumbent manner, others erect, with the habit almost of a *Mnium*. In some species there are indications that the erect stems are really upright branches arising from a rhizome. The teeth of the peristome have the structure common to the *Hookeriæ*, the two external cells of which they are composed being separated by an interval along the medial line of division, so that each tooth has externally two bands of coloured cells resting on the margins of the colourless internal band, which is conspicuous through the median line.

Juan Fernandez. *Bertero;* with the preceding—*Moseley.*

Habit and size as in *Porotrichum fasciculatum* and *Porotrichum rigidum*, but in its leaves different from both.

Porotrichum (Thamnium) rigidum, Mitt.

Porotrichum (*Thamnium*) *rigidum*, Mitt. in Journ. Linn. Soc. Lond., xii. p. 467.

Juan Fernandez. *Bertero;* barren stems—*Moseley.*

It was gathered also by Mr Wilson Saunders' collector, amongst whose specimens there occurred a stem with one capsule, small for the size of the moss, of a shortly oval form, horizontal in position, on a penduncle 1 cm. long. The species in size is like *Porotrichum fasciculatum*, Swartz, but with no obtuse leaves. All these species are much larger than *Porotrichum valdiviæ*, or *Porotrichum panduræfolium*, C. Müll., from Chili.

Lepyrodon parvulus, Mitt.

Lepyrodon parvulus, Mitt. in Journ. Linn. Soc. Lond., xii. p. 422.

Juan Fernandez.—On bark with *Zygodon obovalis* and *Leptodon smithii*, barren—*Mr W. Saunders' collector.* Masafuera.—*Cuming.*

Also in Chili.

Leptodon smithii, Mohr.

Leptodon smithii, Mohr., Obs., p. 27; Mitt. in Journ. Linn. Soc. Lond., xii. p. 450.
Neckera smithii, C. Müll., Synopsis Musc. Frond., ii. p. 118.
Hypnum smithii, Dicks., Fasc. ii. Crypt., p. 10, t. 5, fig. 4.

Juan Fernandez.—On bark with *Zygodon obovalis* and *Lepyrodon parvulus*, barren—*Mr W. Saunders' collector.*

It is found in Chili, and extends to South Africa and New Zealand.

Stereodon lechleri, Mitt.

Stereodon lechleri, Mitt. in Journ. Linn. Soc. Lond., xii. p. 535.
Hypnum lechleri, C. Müll. in Bot. Zeit., 1856, p. 455.

Juan Fernandez. *Bertero; Moseley.*

Also found on the Chilian coasts. It differs from the *Stereodon chrysogaster*, C. Müll. *Hypnum portale*, Hook. f. et Wils., which is also found in Juan Fernandez and in New Zealand in about the same particulars as the smaller states of *Stereodon cupressiforme*, differ from those which are more robust, but in the case of *Stereodon lechleri* and *Stereodon chrysogaster*, it is size only that is the most obvious difference, the ramification and colour of the foliage being uniform in both.

Ptychomnion aciculare, Mitt.

Ptychomnion aciculare, Mitt. in Journ. Linn. Soc. Lond., xii. p. 536.
Hypnum aciculare, Bridel, Musc. Recen., ii. 2, p. 158, t. 5, fig. 2; C. Müll., Synopsis Musc. Frond., ii. p. 441.

JUAN FERNANDEZ. *Moseley.*

The specimens which have young fruit belong to that larger form of the species which is also found in South Chili and in the districts adjoining Magellan Strait, the stems and foliage are double the size of those structures found on the species in New Zealand and elsewhere, and it may possibly prove to be a distinct species. The ordinary state of *Ptychomnion aciculare* was gathered in Juan Fernandez by Bertero, and it grows also in Chili.

Hypnum (Rhynchostegium) tenuifolium, Hedw.

Hypnum (Rhynchostegium) tenuifolium, Hedw., Sp. Musc., p. 283, t. 75; Mitt. in Journ. Linn. Soc. Lond., xii. p. 552; C. Müll., Synopsis Musc. Frond., ii. p. 348.

JUAN FERNANDEZ.—Abundant specimens gathered by Mr Wilson Saunders' collector, but almost destitute of capsules.

This species is widely spread in the southern hemisphere.

Hypnum berteroanum, Mont.

Hypnum berteroanum, Mont. in Ann. Sci. Nat., sér. 3, iv. p. 89, et Syll. Crypt., p. 6; Gay, Fl. Chil., vi. p. 17; Mitt. in Journ. Linn. Soc. Lond., xii. p. 551.

JUAN FERNANDEZ. *Moseley.*

Collected in Chili by Bertero and Pœppig, but unknown from any other part of the world.

Hypnum toxarion, Schwägr.

Hypnum toxarion, Schwägr., Suppl., i. 2, p. 283; Müll., Synopsis Musc. Frond., ii. p. 446; Mitt. in Journ. Linn. Soc. Lond., xii. p. 557.

JUAN FERNANDEZ.—Collected by Douglas and Mr W. Saunders' collector; both specimens barren.

It seems to be abundant in Chili and Chiloe, where it has been gathered in fruit by Lechler, King, and Lobb.

Fissidens asplenoides, Hedw.

Fissidens asplenoides, Hedw., Musc. Frond., iii. p. 65, t. 28; C. Müll., Synopsis Musc. Frond., i p. 69; Mitt. in Journ. Linn. Soc. Lond., xii. p. 591.

JUAN FERNANDEZ. *Bertero;* also among mosses gathered by Mr Wilson Saunders' collector.

This moss is widely diffused in the southern hemisphere, and in America it ranges from the West Indies to Chili.

HEPATICÆ.[1]

Plagiochila badia, Mitt., n. sp.

Caulis elongatus, parce ramosus; folia approximata, patentia, patulave ovato-oblonga, margine dorsali decurrente recurva, ventralique integerrima, apice breviter paucidentata.

Habitus staturaque *Plagiochilæ rubescentis*, Lindenb., t. xi., et foliorum ambitu similis, sed margine ventrali integerrima, apice dentibus brevissimis armata subintegerrima. Color nigro-fusca.

Juan Fernandez. *Mr W. Saunders' collector.*

At first sight the specimens of this species might readily be mistaken for *Plagiochila rubescens*, which has often the same dark colour; but the entire absence of the ciliiform teeth at once distinguishes it. Like *Plagiochila rubescens*, the foliage is scarcely altered in the dry state, and it is here and there glossy.

Plagiochila gayana, Gottsche.

Plagiochila gayana, Gottsche in Ann. Sci. Nat., sér. 4, viii. p. 322.

Juan Fernandez.—From the same source as the preceding.

A small-leaved species similar to *Plagiochila geniculata*, Lindenb., t. xxvii., in size and appearance, but quite distinct in the perianth, which is much compressed and with a small contracted truncate mouth, a form that is very rare in the genus. There is considerable variation in the dentation of the ventral margin of the leaf; on some stems the leaves are almost entire, slightly angulate; in other plants they are, as described by Gottsche, dentate all round the ventral side; the areolation is of small round cells with wide walls, the whole almost obscure. It is also very similar to *Plagiochila flexicaulis*, Mont., from Chili; but readily distinguished by the perianth.

Lophocolea sylvatica, Mitt., n. sp.

Prostrata; folia horizontaliter explanata, convexula, ovali-oblonga, apice sinu obtuso biangulata; amphigastria parva, quadridentata, utrinque cum foliis anguste confluentes; involucralia longiora, cum amphigastrio integerrimo apice bidentato basi coalita; perianthium triquetrum, labiis dentatis.

Caulis 1–2 cm. longus, hic illic radicosus cum foliis 2 mm. latus; amphigastria caulem vix latiora saepe recurva. Perianthium 1·50 mm. longum, angulis nudis.

Juan Fernandez.—Creeping amongst *Hypnum toxarion*—*Mr W. Saunders' collector.*

[1] By William Mitten, Esq., A.L.S.

A small species, in all the specimens of a brown colour, which may have been induced by their treatment as packing material; it is closely allied to a number of other South American species of about the same stature, but in the outline of the apices of its leaves, which is similar to that of *Lophocolea kürzii*, S. Lac., it agrees with none, and its perianth is without the winged angles so usual in them.

Chiloscyphus rotundifolius, Mitt., n. sp.

Prostratus, repens; folia explanata, suborbiculata, integerrima; amphigastria caulem parum latiora, bifida, laciniis extus inferne breviter unidentatis liberis; perianthium in ramo brevi laterale; foliis involucralibus oblongis, amphigastrio sub-ovato quadridentato oblongo trigono, labiis rotundatis breviter dentatis.

JUAN FERNANDEZ.—Creeping amongst mosses—*Mr W. Saunders' collector.*

A species in its size, and in the form and substance of its leaves and mode of growth, closely resembling the European *Chiloscyphus polyanthus;* but with its perianth and involucral leaves quite different.

Jungermannia oenops, Lindenb. et Gottsche.

Jungermannia oenops, Lindenb. et Gottsche in G. L. et N. Synopsis Hepat., p. 673.

JUAN FERNANDEZ. *Bertero; Moseley.* Small barren blackened specimens.

It closely resembles *Jungermannia colorata.*

Jungermannia fernandeziana, Mitt., n. sp.

Caulis satis crassus, elongatus, procumbens; folia semiverticalia, explanata vel sursum secunda, ovata, apice sinu parvo obtuso bidentata, cellulis rotundatis limitibus latiusculis pellucidis.

Caulis 2–3 cm. longus, simplex vel divisæ. Folia 1 mm. longa, sicca parum mutata, pallide fusca.

JUAN FERNANDEZ.—A few barren stems—*Moseley.*

A very distinct species, but of very uncertain genus. The areolation is of cells variable in size, but all, like their wide walls, pellucid. There is no amphigastrium.

Calypogeia fistulata, Mitt., n. sp.

Caulis procumbens, radicellis pallidis ad terram adhærens; folia sursum incurva, explanata, patentia, approximate imbricata, ovato-oblonga, obtusa, marginibus dorsalibus basi approximatis liberis, ventralibus imbricatis caulem tegentibus; perianthium e caulis medio descendens, elongatum, radiculosum.

Caulis 1 cm. longus, pallidus, crassiusculus; folia 1 mm. longa, e cellulis rotundatis minutissime granulatis limitibus angustis areolata, pallida, carnosula, hic illic roseo tinctis. Tubus perianthii 1 c.m. longus vel brevior, pallidus, radicellis pallidis sparsis.

Juan Fernandez. *Mr W. Saunders' collector.*

A small plant which might at first sight be taken for fragments of *Jungermannia colorata* from the colour of its foliage. The tube is probably at first apical, but is left behind by continuation of the stem, on which several of different lengths are produced. In the very small quantity available for examination no aperture is observable over the top of the tube, the stem being to all appearance continuous, but the tubes are fistulose, and thus not to be confounded with flagella or stolons.

Balantiopsis purpurata, Mitt., n. sp.

Caulis procumbens, subsimplex; folia explanata, lobo ventrali patente divergente ovato, apice dentibus spiniformibus parvis 2–4 armato, basi dorsali cum lobo dorsali quadruple minore late ovato apice 3–4 spinoso dentato appresso breviter confluente; amphigastria parva, profunde quadripartita, laciniis subulatis.

Cæspites depressi, lati, caulibus laxe intertexti 1–2 cm. longi plerumque simplices, foliis pallide fusco albidis 2 mm. latis colore roseo purpureove tinctis, e cellulis elongatis limpidis areolatis.

Juan Fernandez.—Amongst mosses used for packing plants sent by Mr W. Saunders' collector.

This appears to grow in the same manner as *Kantia trochomanis* when the tufts are sufficiently dense that the stems overrun each other. It is not so white as *Balantiopsis diplophylla*, with which it agrees in having the two lobes of its leaves connected with a keel, which is, however, much shorter than in that species; besides which the outline of the leaf is ovate, the terminal teeth small, and the amphigastrium deeply cleft into four narrow laciniæ, arranged in the divergent manner usual in *Lophocolea* and *Chiloscyphus*.[1]

[1] There are two other species which come near to this :—

Balantiopsis versicolor, Mitt., n. sp.—Caulis procumbens ramis remotis divisus; folia lobo ventrali ambitu ovato medio convexo margine, ventrali recurvo, lobo dorsali appresso caulem tegente dimidio minore, ambobus apicibus emarginatis bidentatis marginibus ubique dentibus ciliiformibus fimbriatis basi in carina brevissima coalitis; amphigastria profunde biloba, lobis divergentibus oblongis obtusis ubique ciliatis.

Caulis 2–3 cm. longus ramis remotis alternis cum foliis 2 mm. latus. Folia pallide fusca, apicalia plerumque purpurata.

Valdivia, Sainthill, Reed; also a specimen in the British Museum Herbarium, marked "Oregon, Lobb," probably also Chilian.

Rather smaller than *Balantiopsis purpurata*, and not quite so soft and flaccid, with both lobes of the leaf ciliated all round the margins as well as round the margins of the differently shaped amphigastrium; in the

Gottschea berteroana, Nees.

Gottschea berteroana, Nees in G. L. et. N. Synopsis Hepat., p. 14.
Jungermannia berteroana, Hook., Bot. Misc., i. p. 148, t. 78.
Notarisia lycopodioides, Colla in Mem. Accad. Sc. Torino, xxxix. p. 53, t. 75, fig. 2?

JUAN FERNANDEZ. *Bertero; Moseley.*

Barren stems of a smaller state were collected by Mr W. Saunders' collector. It is apparently confined to the island.

We have added *Notarisia* as a synonym of this plant, after a comparison of the descriptions and the inscription on Bertero's label, and there is little doubt that it is the same.

Radula microloba, Gottsche.

Radula microloba, Gottsche in G. L. et N. Synopsis Hepat., p. 259.

JUAN FERNANDEZ. *Bertero;* in a bad state on mosses, gathered by Mr W. Saunders' collector.

The species is very nearly allied to *Radula pallens*, Swartz.

insertion of the leaves, both lobes are placed on the stem in a similar manner to those of some species of *Martinellia*, the middle part of each lobe being attached higher up the stem than the angles and intermediate keel.

Balantiopsis æquifolia, Mitt., n. sp.—Caulis ramis paucis remotis divisus; folia densiuscule inserta, lobis dorsalibus et ventralibus æqualibus basi brevissime in carina coalitis ovatis apice sinu parvo angusto bidentatis, marginibus dentibus paucis spiniformibus ciliatis; amphigastris ovali-rotundatis, apice lobis irregularibus brevibus bispinosis et dentibus spiniformibus remotis ciliata.

Caulis cum foliis 1·50 mm. latus. Folia fusco-alba.

Habitat.—Port Churruca, Magellan; inter *Bruteliam* repens, Cunningham.

In the nearly equal size of the dorsal and ventral leaf-lobes and amphigastrium, equalling in size one of the lobes, as well as in its form, this differs considerably from any of the others.

Balantiopsis erinacea (*Scapania*, Taylor), differs at once from all the other known species in the two leaf-lobes being free at their bases, as is figured, Fl. Ant., t. 161, iv. The outline of the leaf is, however, more orbicular-ovate, bidentate at the point with ciliiform teeth all round. This came from the Falkland Islands. Very incomplete specimens have since been sent from New Zealand, they are not quite certainly the same. *Balantiopsis diplophylla* (*Scapania*, Taylor), from New Zealand, is fairly represented in the figure Fl. Ant., t. 64, iv.; its lobes are connected as in *Martinellia;* it is found also in Tasmania. Another species as it appears was sent from New Zealand by Dr Knight, who sent also a sketch of its perianth, which agrees very nearly with a small specimen gathered previously at New Plymouth, New Zealand. *Balantiopsis knightii*, Mitt., n. sp.—Caulis procumbens; folia explanata, lobo ventrali subrotundo, oblonga, divergentia, apice tri quadridentata, lobo dorsali minuto quadrate ovato apice bitridentato appresso, basi carina brevissima cum dorsale coalito, perianthio oblongo cylindraceo radiculoso, capsula cylindracea, lobis demum in spiram contortis.

This agrees in size with *Balantiopsis diplophylla*, but is in all the few specimens seen a shorter-stemmed plant; its dorsal leaf-lobe is so small that it is not wider than half the diameter of the stem, which is thus left exposed; in all the other species the stem is covered. The ventral lobe is quite entire except at the apex, where it is provided with a few short teeth, thus differing from the spiniform teeth common to the other species.

So far as can be seen in the specimens, the amphigastrium takes no part in the formation of the perianth, which is in all the species terminal, the two leaves immediately next its orifice, but slightly modified in form. All these species agree in their areolation of elongate limpid cells, and in this respect, as well as in the form and insertion of the leaves, differ greatly from *Tylimanthus;* and, indeed, from all the other genera which fruit from a descending sac.

Porella chilensis, Mitt.

Madotheca chilensis, G. L. et N., Synop. Hepat., p. 274.

JUAN FERNANDEZ. — Specimens in a very slender state, without fructification — *Moseley.*

Also in Chili and Peru.

The smallest species of the genus. It appears to be common in Chili, where also is found a state of *Porella stangeri*, Lindenb. et Gottsche, with more densely inserted leaves, and with the margins of its amphigastria more revolute=*Madotheca fœtens*, De Notaris Jung. Amer. Pug., p. 25, fig. xvii.; but the perianth is the same as in specimens from New Zealand. In the Synopsis Hepat., p. 280, the perianth is described as—"Bilabiatum, labiis denticulatis," which is the condition when broken up by the egress of the capsule, before which it is ovate apiculate, and the mouth far too small to allow of the protrusion of the capsule without its disruption.

Lejeunia subfusca, Nees.

Lejeunia subfusca, Nees in G. L. et N. Synopsis Hepat., p. 315.

JUAN FERNANDEZ.—Fragments on *Porotrichum—Moseley.* Gathered also by Bertero and by Mr W. Saunders' collector.

Whether this is really identical with the Javan species may be doubtful, for it is quite probable that there is a group of dark-foliaged species which scarcely differ in the barren state.

Riccardius multifidus, Gray.

Riccardius multifidus, Gray, Brit. Pl., i. p. 684.
Aneura multifida, Dumort, Hepat. Europ., p. 141; G. L. et N., Synop. Hepat., p. 496.
Jungermannia multifida, Linn., Sp. Pl., ed. 2, p. 1602.

JUAN FERNANDEZ.—Among mosses—*Mr W. Saunders' collector.*

The fragments being all quite barren, it is impossible to be quite certain that they are specifically identical with the European *Riccardius multifidus*, which is generally supposed to be a common species and found almost everywhere; but it appears from descriptions and from specimens usually found in herbaria that besides the *Aneura latifrons*, Lindenb., there is confused with it *Aneura bipinnata*, Swartz, described originally from West Indian specimens, but which is found in the south of England and Ireland, and is probably very widely spread.

Symphyogyna hochstetteri, Nees et Mont.

Symphyogyna hochstetteri, Nees et Mont. in G. L. et N. Synop. Hepat., p. 485.

JUAN FERNANDEZ. *Moseley.*

Specimen without fruit exactly similar to those gathered by Bertero. It is found also in Chili (Lechler, 187), and is enumerated by Gottsche in the flora of New Grenada.

This species in its habit is intermediate between the species with and without stipes, some of its fronds being stipitate, others are as if indefinite; the foliaceous expansion is irregularly sinuate. In this particular it approaches the *Symphyogyna sinuata* (Sw.), which extends from the West Indian Islands to South Chili, whence also have come specimens of *Symphyogyna hymenophyllum*.[1]

Marchantia berteroana, Lehm. et Lindb.

Marchantia berteroana, Lehm. et Lindb. in G. L. et N. Synop. Hepat., p. 525.

JUAN FERNANDEZ.

Originally described from Bertero's specimens. It resembles *Marchantia polymorpha* when in that state in which the dark vein-like marking in the middle of the fronds is wanting, but is more robust than usual in British forms.

Also in Chili.

FUNGI.

No fungi were collected in Juan Fernandez by Mr Moseley, or at least none came to hand.

LICHENES.[2]

Leptogium azureum, Mont.

Leptogium azureum, Mont., Cuba. Crypt., p. 114, et in Gay, Fl. Chil., viii. p. 224; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223; Nyl., Synopsis Lich., i. p. 125.

JUAN FERNANDEZ. *Moseley.*

Nylander (*loc. cit.*) places this as a variety of the almost cosmopolitan *Leptogium tremelloides*.

[1] The genus *Umbraculum*, Gottsche, *Bot. Zeit.*, 1861, p. 1–3, and *Ann. Sci. Nat.*, 5ième. sér., t. 1, 1865, p. 180, of which the type is *Jungermannia flabellata*, Hook., Musc. Exot., t. 13, is represented in the Bogotian Andes by *Umbraculum andinum*, Mitt., n. sp., stipite in frondem semicircularem flabellatim expanso, divisionibus tri-quaterne dichotomis integerrimis, squama involucrale rotundata denticulata, calyptra cum perianthio cylindraco basin versus concreta. Stipes 1·50 cm., ala nulla, frondo 1 cm. lata divisionibus 1–1·50 mm. latis, perianthium 2 mm. longum infra squamam involucralem carnosulum.

Other species referred to this genus are *Umbraculum mulleri*, Gottsche, from Australia; *Umbraculum leptopoda*, Tayl., from New Zealand; *Umbraculum decipiens*, Mitt. (*Steetzia*), from Ceylon. All these differ from *Symphyogyna* in having a perianth, as in *Palavicinia* = *Steetzia*, G. L. et N. Synop. Hepat., p. 785. In another Andean species, *Umbraculum erythropus*, Gottsche in *Ann. Sci. Nat.*, 5ième. sér., t. 1 (*Mittenia*).

The calyptra being concrete with the perianth towards its base, was thought by Gottsche to be worthy of distinction as a generic character; but as this condition certainly occurs in some others of the species referred to *Umbraculum*, it seems hardly of sufficient importance. *Umbraculum erythropus*, in its fronds having their lobes dentate, nearly resembles *Symphyogyna hymenophyllum*, Hook.

[2] Limited to those collected by Mr Moseley.

Bæomyces chilensis, Crombie.

Bæomyces chilensis, Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Bæomyces rufus, DC., var. *chilensis*, Nyl., Synopsis Lich., i. p. 177.
Biatora byssoides, Fries, var. *chilensis*, Mont. in Gay, Fl. Chil., viii. p. 173.

Juan Fernandez. *Moseley.*

Montagne was disposed to regard the Chilian plant as distinct from the European, but having seen no apothecia, he would not found a species. Crombie (*loc. cit.*) says: "This in all probability is to be regarded as a proper species, distinguished by the thin, whitish, rugulose continuous thallus."

Stereocaulon ramulosum, Acharius.

Stereocaulon ramulosum, Acharius, Meth. Lich., p. 314; Nyl., Synopsis Lich., i. p. 235; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

Juan Fernandez. *Moseley.*

Widely spread in the southern hemisphere, and in America ranging from the Strait of Magellan to Mexico.

Cladonia aggregata, Eschw.

Cladonia aggregata, Eschw.; Nyl., Synopsis Lich., i. p. 218; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223 (*errore Cladia*).

Juan Fernandez. *Moseley.*

Very widely dispersed in the southern hemisphere, and in America northward to the West Indies.

Sticta subvariabilis, Nyl.

Sticta subvariabilis, Nyl. in Flora, 1867, p. 439; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

Juan Fernandez. *Moseley.*

Sticta hypopsila, Nyl.

Sticta hypopsila, Nyl., *fide* Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Sticta linearíloba, Nyl., var. *hypopsila*, Nyl., Synopsis Lich., i. p. 355.
Sticta filicina, var. *linearíloba*, Mont., subvar. *hypopsila* in Ann. Sci. Nat., sér. 3, xviii. p. 308, et in Gay, Fl. Chil., viii. p. 122.

Juan Fernandez. *Moseley.*

Sticta linearíloba, Nyl.

Sticta linearíloba, Nyl., Synopsis Lich., i. p. 355; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Sticta filicina, var. *linearíloba*, Mont. in Gay, Fl. Chil., viii. p. 355.

Juan Fernandez. *Moseley.*

Thelotrema sp. ? Crombie.

Thelotrema sp. ? Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

"On the bark of trees: indeterminable."

Urceolaria scruposa, Acharius.

Urceolaria scruposa, Acharius, Lich. Univ., p. 338; Nyl., Lich. Scand., p. 176; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

A common European species.

Lecidea fernandezii, Crombie.

Lecidea fernandezii, Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

"Omnino est similis *Lecideæ urceolariæ*, Nyl. in Flora, 1873, p. 298, differt autem hypothecio et perithecio fuscis, sporisque fere minoribus, longit. 0·010–0·014 millim., crassit. 0·004–0·006 millim. Forsan varietas *Lecideæ urceolariæ*."

JUAN FERNANDEZ.—Parasitic on *Urceolaria scruposa*—*Moseley.*

ALGÆ.

MELANOSPERMEÆ.

Zonaria variegata, Lamour.

Zonaria variegata, Lamour., Dict., p. 11; J. G. Agardh, Sp. Alg., i. p. 108; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ.—On *Corallina subulata*. *Moseley.*

Chiefly in the Atlantic; also in the Indian Ocean and on the coast of Australia.

Dictyota kunthii, J. G. Agardh.

Dictyota kunthii, J. G. Agardh, Sp. Alg., i. p. 94, et Ic. ined., t. 15; Gay, Fl. Chil., viii. p. 260; Dickie in Journ. Linn. Soc. Lond., xv. p. 452; Hook. f., Handb. Fl. N. Zeal., p. 657.

JUAN FERNANDEZ. *Moseley.*

Common on the coasts of Chili and New Zealand, and extending northward in the Pacific to California.

Dictyota nævosa, Suhr.

Dictyota nævosa, Suhr; Eckel., n. 8; J. G. Agardh, Sp. Alg., i. p. 95; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

South Africa; Tasmania.

Asperococcus sinuosus, Roth.

Asperococcus sinuosus, Roth, Cat., iii. p. 327 ; J. G. Agardh, Sp. Alg., i. p. 75 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452 ; Hook. f., Handb. Fl. N. Zeal., p. 658.

JUAN FERNANDEZ. *Moseley.*

New Zealand ; Australia ; Indian Ocean ; Red Sea ; North and South Atlantic to the Falkland Islands.

Asperococcus echinatus, Mert.

Asperococcus echinatus, Mert. ; J. G. Agardh, Sp. Alg., i. p. 76 ; Hook. f., Handb. Fl. N. Zeal., p. 658 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

Australia ; Lord Auckland's Group ; Eastern and Western North Atlantic.

Chordaria hippuroides, Bory.

Chordaria hippuroides, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 139 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452 ; J. G. Agardh, Sp. Alg., i. p. 67.

JUAN FERNANDEZ. *Moseley.*

Previously recorded only from the coast of Chili.

RHODOSPERMEÆ.

Polysiphonia parasitica, Huds.

Polysiphonia parasitica, Huds., Fl. Angl., p. 604, var. *γ reptans ;* J. G. Agardh, Sp. Alg., ii. p. 931 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

Agardh records this variety from the Pacific Ocean, growing on the fronds of *Phyllospora chamissoi.*

Polysiphonia villum, J. G. Agardh.

Polysiphonia villum, J. G. Agardh, Sp. Alg., ii. p. 941 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ.—Growing on *Codium tomentosum—Moseley.*

This species was founded upon specimens collected by Liebmann on the coast of Tropical America, and Dickie places the sign of doubt after the name in the Herbarium, though it does not appear in the Linnean Journal.

Corallina subulata, Ell.

Corallina subulata, Ell. et Sol., d. 120, t. 21, ex J. G. Agardh, Sp. Alg., i. p. 570 ; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

Agardh records this from the West Indies and the coast of Brazil near Bahia.

Corallina berteri, Mont.

Corallina berteri, Mont. in Harv. Nereis Australis, p. 103, 1847, et in Gay, Fl. Chil., viii. p. 318 (1852, *berteroana*); Dickie in Journ. Linn. Soc. Lond., xv. p. 452; J. G. Agardh, Sp. Alg., i. p. 566.

Juan Fernandez. *Moseley.*

Melobesia pustulata, Lamour.

Melobesia pustulata, Lamour, Hist. Polyp. Flex., p. 315, t. 12; Kütz., Sp. Alg., p. 696; Harv., Nereis Australis, p. 110; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

Atlantic, Mediterranean, and Adriatic, and in the Pacific on the coast of Norfolk Island.

Gigartina contorta, Bory.

Gigartina contorta, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 153; J. G. Agardh, Sp. Alg., iii. p. 190; Gay, Fl. Chil., viii. p. 335; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

The only previous record of this species is Concepcion (D'Urville).

Ceramium rubrum, Huds.

Ceramium rubrum, Huds., Fl. Angl., p. 600; J. G. Agardh, Sp. Alg., iii. p. 100; Hook. f., Handb. Fl. N. Zeal., p. 707; Gay, Fl. Chil., viii. p. 356; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

A common and variable seaweed inhabiting the temperate seas of both hemispheres.

Centroceras micracanthum, Kütz.

Centroceras micracanthum, Kütz. in Linnæa, 1842, p. 741, et Sp. Alg., p. 688; Dickie in Journ. Linn. Soc. Lond., xv. p. 452 (*sphalmate micranthum*).

Juan Fernandez. *Moseley.*

Ptilota parva, Dickie.

Pinnis oppositis difformibus, una minore simplici, subulata, altera majore, pinnulata, pinnulis subulatis obtusis, vel subconicis, omnibus cellulosis. Sphærosporis—? Favellis—? (Dickie in Journ Linn. Soc. Lond., xv. p. 452).

Juan Fernandez.—A few specimens mixed with *Centroceras—Moseley.*

CHLOROSPERMEÆ.

Codium tomentosum, C. A. Agardh.

Codium tomentosum, C. A. Agardh, Sp. Alg., i. p. 452; Kütz., Sp. Alg., p. 500; Hook. f., Handb. Fl. N. Zeal., p. 714; Gay, Fl. Chil., viii. p. 275; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Ulva latissima, Linn.

Ulva latissima, Linn., Sp. Pl., ed. 2, p. 1632; Kütz., Sp. Alg., p. 474; Hook. f., Handb. Fl. N. Zeal., p. 715; Gay, Fl. Chil., viii. p. 369; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Enteromorpha intestinalis, Link.

Enteromorpha intestinalis, Link., Hor. Phys. Berol., p. 5; Kütz., Sp. Alg., p. 478; Hook. f., Handb. Fl. N. Zeal., p. 716; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Chætomorpha ærea, Kütz.

Chætomorpha ærea, Kütz., Sp. Alg., p. 379; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.
Conferva ærea, Dillw., Conf., t. 80; Hook. f., Handb. Fl. N. Zeal., p. 719.

JUAN FERNANDEZ. *Moseley.*

Europe; Australia; New Zealand.

Chætomorpha tortuosa, Kütz.

Chætomorpha tortuosa, Kütz., Sp. Alg., p. 376; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Mediterranean; Adriatic, &c.

Cocconeis scutellum, Ehrenb.

Cocconeis scutellum, Ehrenb., Infus., p. 194, t. 14, fig. 8; Kütz., Sp. Alg., p. 52; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

On both sides of the North Atlantic; Mediterranean; Adriatic.

Melosira nummuloides, Kütz.

Melosira nummuloides, Kütz., Sp. Alg., p. 27; Dickie in Journ. Linn. Soc. Lond., p. 453.

JUAN FERNANDEZ. *Moseley.*

On both sides of the North Atlantic.

Grammatophora marina, Kütz.

Grammatophora marina, Kütz., Bacill., p. 128, t. 17, fig. 24, et Sp. Alg., p. 120; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Widely spread in the Atlantic and Pacific Oceans.

Biddulphia aurita, Bréb.

Biddulphia aurita, Bréb.; Kütz., Sp. Alg., p. 136 (*Odontella*); Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Biddulphia pulchella, Gray.

Biddulphia pulchella, Gray ex Dickie in Journ. Linn. Soc. Lond., xv. p. 453; Kütz., Sp. Alg., p. 137 (*Biddulphia trilocularis*, Kütz.)

JUAN FERNANDEZ. *Moseley.*

Kützing records this from the West Indies and the coast of Peru.

Climacosphenia moniligera, Ehrenb.

Climacosphenia moniligera, Ehrenb.; Kütz., Sp. Alg., p. 114; Dickie in Journ. Linn. Soc. Lond., xv. p. 453 (*Climacosphæria sphalmate*).

JUAN FERNANDEZ. *Moseley.*

LIST OF THE JUAN FERNANDEZ CELLULAR CRYPTOGAMS, published by Montagne in the Annales des Sciences Naturelles (série 2, iii. pp. 347–356, iv. pp. 86–99), and in Gay's Flora Chilena, vi. and vii.[1]

MUSCI.

Racopilum tomentosum, Brid.; *Hypnum neckerioides*, Hook.; *Hypnum serrulatum*, Hedw.; *Hypnum aciculare*, Brid.; *Hypnum toxarion*, Schwägr.; *Hypnum crassiusculum*, Schwägr.; *Leskea mollis*, Hedw.; *Hookeria* (*Pterygophyllum*) *splendidissima*, Mont.; *Bartramia stricta*, Brid.; *Macromitrium urceolatum*, Brid.; *Macromitrium fimbriatrum*, Schwägr.; *Notarisia crispata*, Mont.; *Tortula* (*Syntrichia*) *flagellaris*, Mont.; *Trichostomum longifolium*, Brid.; *Campylopus introflexus*, Brid.; *Phascum nervosum*, Hook.

[1] Montagne's nomenclature is retained throughout.

HEPATICÆ.

Gottschea berteroana, Nees.; *Plagiochila neesiana*, Lindb.; *Jungermannia colorata*, Lehm.; *Jungermannia crassula*, Nees et Mont.; *Lophocolea æquifolia*, Nees et Mont.; *Chiloscyphus amphibolius*, Nees; *Trichocolea tomentella*, Dumort; *Radula pallens*, Nees; *Radula microloba*, Gottsche; *Madotheca subsquarrosa*, Nees et Mont.; *Lejeunia acuminata*, Lehm. et Lindb.; *Symphyogyna hochstetteri*, Nees et Mont.; *Marchantia berteroana*, Lehm. et. Lindb.

FUNGI.

Agaricus capillaris, Schum.; *Agaricus aulaxinus*, Mont.; *Agaricus variabilis*, Pers.; *Xerotus berterii*, Mont.; *Polyporus dictyopus*, Mont.; *Polyporus senex*, Nees et Mont.; *Polyporus concrescens*, Mont.; *Polyporus versicolor*, Fries; *Polyporus fernandesianus*, Mont.; *Polyporus vaporarius*, Fries; *Polyporus violaceus*, Fries; *Hydnum coralloides*. Scop.; *Hydnum ochraceum*, Pers.; *Hydnum leptodon*, Mont.; *Hydnum niveum*, Pers.; *Odontia cinnamomea*, Mont.; *Stereum tabacinum*, Fries, var. *australe*, Mont.; *Tremella lutescens*, Pers.; *Mitruba berterii*, Mont.; *Peziza abnormis*, Mont.; *Peziza spadiceo-atra*, Mont.; *Peziza cerina*, Pers.; *Helotium citrinum*, Fries; *Patellaria pulla*, Fries; *Xylaria hypoxylon*, Grev.; *Xylaria multiplex*, Kunze; *Rhizomorpha subcorticalis*, Pers.; *Hypoxylon berterii*, Mont.; *Hypoxylon serpens*, Fries; *Hypoxylon anthracodes*, Fries; *Dothidea conspuscata*, Berkl.; *Nectria discophora*, Mont.; *Sphæria mammæformis*, Pers.; *Antennaria robinsonii*, Mont.; *Trichoderma viride*, Pers.; *Æthalium septicum*, Fries; *Trichia clavata*, Pers.; *Ceratium hydnoides*, Alb. et Schw.; *Fusisporium chilense*, Mont.; *Fusisporium ochraceum*, Mont.; *Æcidium cestri*, Mont.; *Æcidium berberidis*, Pers.

LICHENES.

Usnea florida, Hoffm.; *Usnea ceratina*, Acharius; *Ramalina fraxinea*, Acharius; *Ramalina subulata*, Mont.; *Peltigera polydactyla*, Hoffm.; *Nephroma plumbea*, Mont.; *Sticta endochrysa*, Delise; *Sticta hirsuta*, Mont.; *Sticta mougeotiana*, Delise; *Sticta carpoloma*, Delise; *Sticta argyracea*, Delise; *Sticta richardi*, Mont.; *Sticta freycinetii*, Delise; *Sticta filicina*, Acharius; *Sticta berteroana*, Mont.; *Parmelia sphinctrina*, Mont.; *Parmelia rubiginosa*, Acharius; *Parmelia nigro-cincta*, Mont.; *Parmelia gossypina*, Mont.; *Parmelia parvifolia*, Mont.; *Parmelia pholidota*, Mont.; *Parmelia gelida*, Acharius; *Parmelia leucochlora*, Mont.; *Stereocaulon corallinum*, Schreb.; *Cladonia rangiferina*, Hoffm.; *Biatora mutabilis*, Mont.; *Biatora carneola*, Fries; *Heterothecium berteroanum*, Mont.; *Opegrapha scripta*, Acharius; *Sphærophoron compressum*, Acharius; *Pertusaria wulfenii*, DC.; *Pertusaria communis*, DC.; *Pyrenastrum chilense*, Mont.; *Verrucaria analepta*, Acharius; *Verrucaria actinostoma*, Acharius; *Collema saturninum*, Acharius; *Leptogium azureum*, Mont.; *Leptogium marianum*, Mont.

ALGÆ.

Dictyota kunthii, Grev.; *Dictyota phlyctænodes*, Mont.; *Liagora brachyclada*, Dcne.

APPENDIX

ON THE VEGETATION OF SAN AMBROSIO AND SAN FELIX.

From San Ambrosio and San Felix we have only seen fragments, without flowers or fruit, of three plants, doubtless Compositæ, collected by Dr Coppinger of H.M.S. "Alert;" but Dr R. A. Philippi [1] has published some particulars of the physical conformation and vegetation of these islands, which is reproduced here in a condensed form, for the little that is known seems to indicate a distinct affinity with the flora of Juan Fernandez.

San Ambrosio and San Felix are in the same longitude as Juan Fernandez, and in about 26° S. latitude, opposite the harbour of Caldera, and distant therefrom nearly 450 English miles. Commander Simpson of the Chilian navy visited both islands in 1869, and reported thereon as follows:—The principal island of the San Ambrosio group is a plateau, about 1300 feet above the level of the sea, and rising perpendicularly from the sea almost all round, with a peak at the south-west end 125 feet higher. On the east side is an arched triangular rock some 125 feet high, running north and south, and separated from the main island by a channel a hundred yards wide. Besides this, there is another rock about sixty-five feet high; and in continuation of the same, distant about three-quarters of a nautical mile, a conical rock 130 feet high, which being white with birds' dung, looked in the distance like a boat under sail. North-west of San Ambrosio, some 200 yards, another rock was visible. The north side of the island is free from rocks, but the south side is studded with reefs. All along the north side only two small bays were seen where landing was feasible, one, half a nautical mile from the north-west point, and the other in the middle. It was only from the latter that the high land could be reached by ascending a small ravine that there runs down to the coast. Learning from Findlay's "Directory of the Pacific Ocean" that a copious spring of good fresh water was reported to exist on the top, it was resolved to make the ascent, which was not accomplished without much difficulty and an hour's toil. On reaching the top of the island, it was found to be nearly elliptical in shape, and two and a half nautical miles long by one broad, and traversed from north to south by ravines, in which were traces of fresh water. But, although the island was traversed in all directions, only sufficient water was found to quench the thirst of the party; therefore it was inferred that the person who informed

[1] *Bot. Zeit.*, 1870, pp. 496–502, t. 2.—Vegetation der Inseln San Ambrosio und San Felix.

Findlay must have visited the island at a more rainy season. The mass of the island is evidently volcanic with veins of granite (?), with gravel and iron (?), covered with a thin layer of sandy earth saturated with guano, loose, and full of rents, as though it had recently undergone some violent shocks. In the middle is a hollow which appears to have been the crater.

With regard to the vegetation, on the flat parts only one species of *Liguerilla* [*Dendroseris?*] existed; it was usually eighteen inches high, but sometimes double that height. In the ravines, where it was damp, there were other plants, of which specimens were collected; but no grass or edible plant was seen. Of living beings, only three kinds of sea-birds were seen, and they were different from those of the Chilian coast, and so tame that one had to be careful to avoid treading upon them in their nests.

Ten nautical miles westward from San Ambrosio is the group of San Felix, which consists of two islands and a rock. The main island measures two nautical miles from east to west by half a mile broad, with a general height of 200 feet, rising in the north-west to 400 feet. There is no beach except in two small spots on the north and west sides; otherwise it is not difficult to reach the plateau. The moss of the island is identical with that of San Ambrosio, but the thickness of the loose layer of earth is greater, being in places as much as a yard. It consists almost wholly of fresh white guano, apparently of excellent quality,[1] and many shiploads of it might be obtained. The vegetation was limited to a single nettle; and the birds were the same as in San Ambrosio. No drinkable water was found. About half a mile west-north-west of the western point of San Felix is a singular rock some 300 feet high with two pointed pyramids; hence the Spaniards have named it "Brigantine," and the English "Peterborough Cathedral."

The specimens of plants were mere fragments, brought away by Commander Simpson in his hat, and were never properly pressed; still Dr Philippi was able to determine them, with the exception of two. And two of the plants collected by Dr Coppinger are evidently the same as two of those described by Philippi. The plants known are:—

MALVACEÆ.

Malva limensis, Linn.

Malva limensis, Linn., Sp. Pl., ed. 2, p. 968? Philippi in Bot. Zeit., 1870, p. 498.

San Ambrosio. *Simpson.*

Philippi hesitates to refer this unconditionally to *Malva limensis*, Linn., because the carpels are furnished with small teeth or spines, instead of being smooth; but all the specimens we have examined that are so named at Kew are more or less prickly. *Malva peruviana*, Linn., is very closely allied, differing in its more evidently prickly carpels. Perhaps they are better regarded as forms of one species, common from New Grenada to Chili. *Malvastrum* is the genus to which the plant is now generally referred.

[1] A sample was subsequently analysed and found to contain very little ammonia; hence it is of little value.

CUCURBITACEÆ.

Sicyos bryoniæfolius, Moris.

Sicyos bryoniæfolius, Moris, Enum. Sem. Hort. Taurin, 1831; Cogniaux in DC. Monogr. Phanerog., iii. p. 884.

Sicyos badaroa, Hook. et Arn. in Hook. Bot. Miscel., iii. p. 324; Gay, Fl. Chil., ii. p. 410; Philippi in Bot. Zeit., 1870, p. 498.

San Ambrosio. *Simpson.*

Common in Peru and Chili, especially in maritime localities.

UMBELLIFERÆ.

Apium, sp? Philippi.

Apium, sp.? Philippi in Bot. Zeit., 1870, p. 499.

San Ambrosio. *Simpson.*

A branch without flowers or fruit, smelling strongly of celery. Philippi could only vouch that it is not *Apium chilense*, for the branch is not furrowed, and the segments of the leaves are much narrower, quite linear, and quite entire.

COMPOSITÆ.

Lycapsus tenuifolius, Philippi.

Lycapsus tenuifolius, Philippi in Bot. Zeit., 1870, p. 499, t. 8a, fig. 1–5; Benth. et Hook., Gen. Plant., ii. p. 240 (*sub Aloma*).

San Ambrosio.—Endemic—*Simpson; Coppinger.*

Simpson's specimen bore flower-heads; but Coppinger's, from the rocks south of the mainland, though otherwise ample, are destitute of both flowers and fruit. It is a shrubby plant, with rather slender branches, and finely cut, deeply pinnatifid, somewhat fleshy leaves. Philippi regarded it as the type of a new genus of the suborder Eupatoriaceæ. In its shrubby habit it is very different from *Aloma*, which Bentham and Hooker, from the description and figure, think it may be; but we have no material to test its claims to generic rank.

Dendroseris? lacerata, Hemsl.

Rea? lacerata, Philippi in Bot. Zeit., 1870, p. 499, t. 8a, fig. 6.

San Ambrosio.—Endemic—*Simpson; Coppinger.*

Philippi founded this species on a single leaf and Simpson's oral information that the stem was about an inch thick, soft, with a milky juice, and only little branched at the ends, with the leaves crowded at the end of the branches. Coppinger's specimens, col-

lected on the rocks south of San Ambrosio, also want flowers and fruit: they consist of portions of the branches, about half an inch thick in the dry state, with three or four leaves at the end. We have little doubt that it belongs to the Cichoriaceæ, and it is most likely a congener of the Juan Fernandez plants of this suborder.

Dr Coppinger also collected a young plant of what may be the same or a closely allied species. It is barely six inches high, with leaves about two inches long.

BORAGINEÆ.

Heliotropium stylosum, Philippi.

Heliotropium stylosum, Philippi in Bot. Zeit., 1870, p. 500.

San Ambrosio.—Endemic.—*Simpson.*

Described as a very much branched shrub with crowded linear leaves and crowded flowers; but Philippi was unable to determine whether it was a true *Heliotropium* or *Heliophytum*. He compares it with *Heliophytum pycnophyllum*, Philippi, and *Heliophytum floridum*, D.C., Chilian species, with which it agrees in habit, differing in floral characters.

CHENOPODIACEÆ.

Atriplex ? foliolosum, Philippi.

Atriplex ? foliolosum, Philippi in Bot. Zeit., 1870, p. 500.

San Ambrosio.—Endemic—*Simpson.*

A glabrous shrubby species, having crowded, minute, sessile leaves, all bearing gemmæ of two to three leaves in their axils. Flowers and fruit unknown.

URTICACEÆ.

Parietaria feliciana, Philippi.

Parietaria feliciana, Philippi in Bot. Zeit., 1870, p. 501.

San Felix.—Endemic. *Simpson.*

Described apparently as an annual, five inches high, with roundish leaves and hermaphrodite tetrandrous flowers, solitary in a three-leaved involucre. Nothing is said about its affinities.

THE SOUTH-EASTERN MOLUCCAS.

INTRODUCTORY NOTES.

This Report deals with all those islands lying between North-West Australia and South-West New Guinea, and included within 126° and 130° E. longitude, and within 5° and 9° S. latitude, from which there are any collections of plants in the Kew Herbarium. Thus limited, the better known islands of Ceram, Amboina, and Buru are excluded; and Wetter is the most westerly, and the Arrou group the most easterly, of those under consideration. In order to enhance the interest of this Report, some recent collections from the same region at Kew, made by Mr H. O. Forbes and Mr Riedel, have been incorporated with the Challenger collections; yet even with this addition, the whole is a mere fragment of the flora, and almost entirely restricted to the littoral element. Nevertheless, as a contribution to the geographical distribution of plants inhabiting the coasts of tropical seas, this Report possesses, perhaps, as much interest as any one of the botanical series. The Challenger Expedition visited the Arrou and Ki groups, but the botanical collections made by Mr Moseley and other officers reached this country in such a rotten, broken condition that, although the common plants were recognisable, a large proportion of the species are indeterminable, or, if clearly distinguishable from all other known species, the specimens are too imperfect for description. So far as the collections examined are concerned, there is nothing in them indicating an endemic generic element in the flora of the South-eastern Moluccas, for all the apparently undescribed species belong to genera of the Asiatic, Australian, or Polynesian regions; yet from Mr Moseley's description of the vegetation of the Arrou and Ki groups, reproduced below, it must be rich and diversified, and there is little doubt that a thorough exploration of the forests of the interior of the islands would yield a rich harvest. Wallace, too, in his Malay Archipelago, frequently alludes to the variety and luxuriance of the vegetation of the Arrou and Ki groups, and one passage concerning the forests of Arrou is specially interesting. He says (vol. ii. p. 203):—"As I became familiar with the forest scenery of the island, I perceived it to possess some characteristic features that distinguished it from that of Borneo and Malacca, while, what is very singular and interesting, it recalled to my mind half-forgotten impressions of the forests of Equatorial America. For example, the palms were much more abundant than I had generally found them in the East, more generally mingled with the other vegetation, more varied in form and aspect, and presenting some of those lofty and majestic smooth-

stemmed, pinnate-leaved species, which recall the Uanassú (*Attalea speciosa*) of the Amazon, but which I had hitherto rarely met with in the Malayan Islands." In like manner, he found the number and variety of butterflies, spiders, and lizards—to say nothing of the elegant and gorgeously coloured birds—greater than in any other part of the Archipelago. He specially mentions (ii. p. 199), that he had taken about thirty species of butterflies in one day, being more than he had ever captured in the same time since leaving the prolific banks of the Amazon. In another place (ii. p. 184) he says :—"The forests of Kei produce magnificent timber, tall, straight, and durable, of various qualities, some of which are said to be superior to the best Indian teak." Again (p. 189) :—"In the forests of Kei arboreal Liliaceæ and Pandanaceæ abound and give a character to the vegetation in the more exposed rocky places. Flowers were scarce, and there were not many orchids, but I noticed the fine white butterfly orchis, *Phalænopsis grandiflora*, or a species closely allied to it. Tall, clean trunks, many of them buttressed, and immense trees of the fig family, with aerial roots stretching out and interlacing and matted together for fifty or a hundred feet above the ground, were the characteristic features; and there was an absence of thorny shrubs and prickly rattans, which would have made these wilds very pleasant to roam in, had it not been for the sharp honeycombed rocks already alluded to. In damp places a fine undergrowth of broad-leaved herbaceous plants was found, about which swarmed little green lizards."

Wallace spent the greater part of his time at Dobbo, in the small island of Wamma, and describing (p. 208) his first visit to Wokan, "an island forming part of the mainland," he says :—"I did not, however, expect in this excursion to see any decided difference in the forest or its productions, and was therefore agreeably surprised. The beach was overhung with the drooping branches of large trees, loaded with Orchideæ, ferns, and other epiphytal plants. In the forest there was more variety, some parts being dry and with trees of a lower growth, while in others there were some of the most beautiful palms I had ever seen, with a perfectly straight smooth slender stem, a hundred feet high, and a crown of handsome drooping leaves. But the greatest novelty and the most striking feature to my eyes were the tree-ferns, which, after seven years spent in the tropics, I now saw in perfection for the first time. All I had hitherto met with were slender species, not more than twelve feet high, and they gave not the least idea of the supreme beauty of trees bearing their elegant heads of fronds more than thirty feet in the air, like those which were plentifully scattered about this forest."

Respecting the physical geography Wallace says (p. 287) :—"The whole of Aru is low, but by no means so flat as it has been represented, or as it appears from the sea. Most of it is dry, rocky ground, with a somewhat undulating surface, rising here and there into abrupt hillocks, or cut into steep and narrow ravines. Except the patches of swamp, which are found at the mouths of most of the small rivers, there is no absolutely level ground, although the greatest elevation is probably not more than two hundred feet. The

rock which everywhere appears in the ravines and brooks is a coralline limestone, in some places soft and pliable, in others so hard and crystalline as to resemble our mountain limestone. The small islands which surround the central mass are very numerous . . . and all are covered with a dense and very lofty forest." Here is another short extract, beginning at p. 294, in which Wallace summarises his knowledge and impressions of the vegetation:—"Persons who have formed the usual ideas of the vegetation of the tropics—who picture to themselves the abundance and brilliancy of the flowers, and the magnificent appearance of hundreds of forest trees covered with masses of coloured blossom, will be surprised to learn, that though vegetation in Aru is highly luxuriant and varied, and would afford abundance of fine and curious plants to adorn our hothouses, yet bright and showy flowers are, as a general rule, altogether absent, or so very scarce as to produce no effect whatever on the general scenery. To give particulars: I have visited five distinct localities in the islands, I have wandered daily in the forests, and have passed along upwards of a hundred miles of coast and river during a period of six months, much of it very fine weather, and till just as I was about to leave, I never saw a single plant of striking beauty, hardly a shrub equal to a hawthorn, or a climber equal to a honeysuckle! It cannot be said that the flowering season had not arrived, for I saw many herbs, shrubs, and forest trees in flower, but all had blossoms of a green or greenish-white tint, not superior to our lime-trees. Here and there on the river banks and coasts are a few Convolvulaceæ, not equal to our garden Ipomœas, and in the deepest shades of the forests some fine scarlet and purple Zingiberaceæ, but so few and scattered as to be nothing amid the mass of green and flowerless vegetation. Yet the noble Cycadaceæ and screw-pines, thirty or forty feet high, the elegant tree-ferns, the lofty palms, and the variety of beautiful and curious plants which everywhere meet the eye, attest the warmth and moisture of the tropics and the fertility of the soil. It is true that Aru seemed to me exceptionally poor in flowers, but this is only an exaggeration of a general tropical feature; for my whole experience in the equatorial regions of the west and east has convinced me that in the most luxuriant parts of the tropics, flowers are less abundant, and on the average less showy, and are far less effective in adding colour to the landscape than in temperate climates. I have never seen in the tropics such brilliant masses of colour as even England can show in her furze-clad commons, her heathery mountain-sides, her glades of wild hyacinths, her fields of poppies, her meadows of buttercups and orchises—carpets of yellow, purple, azure-blue, and fiery crimson, which the tropics can rarely exhibit."

With regard to the former physical condition of the Arrou group, Wallace, after reviewing the geological evidence and the distribution of the plants and animals, but more especially the latter, comes to the conclusion that at no very distant epoch these islands formed a part of New Guinea, and became separated by the subsidence of the great plain which formerly connected them with it.

The stay of the Challenger Expedition at the Arrou and Ki islands little exceeded a

week, so there was not much time for the naturalists to explore the botany, and, as already mentioned, the collections contain nothing strikingly peculiar. A few extracts from Moseley's account of the islands[1] may be inserted here :—

"On our way to the Aru Islands we crossed the Arafura Sea, which lies to the west of New Guinea. The sea is extremely shallow, being only from thirty to fifty fathoms in depth. After a voyage of six days from Torres Straits, we sighted the southern part of the Aru Islands, so familiar to naturalists from Mr Wallace's account of them in his Malay Archipelago, and so full of interest to us as the home of birds of paradise.

"We sailed along the western coast of the island. The southern portions are not covered with forest, but appeared in the distance as open grassy downs, and immediately further north similar open country occurs frequently in patches amongst the forest. The grass, though it appears like turf in the distance, is probably tall and reed-like. A line of cliffs of no great height forms the coast line; they are broken at intervals, and there the coast is wooded and shows a white sandy beach.

"The cliffs appear as if formed of a stratified ferruginous red rock. Here and there on the rocks were conspicuous white patches on the cliffs, the nesting-places of boobies, of which large flocks were seen flying to roost as evening came on. Masses of closely-packed tree-stems, with dense foliage crowns above, appeared lining the shore where it was flat; but no cocoanut palms were to be seen amongst them. After coasting during the whole night, Dobbo, the port of the islands, was reached in the morning. Dobbo lies on the small island of Wamma, which is separated opposite the town by a narrow channel from the large island of Wokan. The striking feature in the vegetation of Wamma, as viewed by one who has just been amongst the Pacific Islands, is the very small proportion of palms showing amongst the general mass of foliage, there being only two small clumps of cocoanut-trees near the town. The leafy masses rising above the white beach might almost be taken to be made up of elm-trees, the tree-tops being rounded in the same manner, and the whole has a dull bluish tint. As we neared Dobbo, turning up the passages between the two islands, we passed large quantities of leaves, fruits, and flowers, and branches of trees floated off from the shores, and now drifting about mingled with a floating sea-weed (*Sargassum*). Off the Kei (Ki) Islands we met with similar drifts of land vegetation and also amongst the Moluccas; and I was astonished at the large quantities of fresh vegetable matter thus seen floating on the sea.

"The sea-birds, especially terns, habitually resort to the floating logs as resting-places, and it is curious to see them in the distance appearing as if standing on the surface of the water, the logs themselves being often invisible. Not only are large quantities of fruits [containing seeds] capable of germinating thus transported from island to island, but entire living plants, even trees, are washed from island to island and transplanted by the waves.

"On the shores of Little Kei Island I found on the beach, above the ordinary reach of the waves, a large mass of the pseudo-bulbs of an epiphytic orchid with its roots complete. It was partly buried at the foot of a tree and seemed quite alive, though it had evidently been washed up in a storm. At Malanipa Island, off the coast of Mindanoa Philippines, I found a young sago-palm, which was just beginning to form a stem, washed up just above the ordinary beach-line, and firmly rooted, though in an inclined position, and growing vigorously. Several authors have described the large quantities

[1] Notes by a Naturalist on the Challenger, p. 366–372.

of floating vegetable matter to be met with in the Malay Archipelago and neighbourhood. Chamisso remarked on the quantity of floating seeds off Java, and the casting up of *Barringtonia*, *Aleurites triloba*, and Nipa palm-seeds on the shores in a germinating condition. These large drifts from the forests have a farther interest, in that they let drop their remains to the bottom of the deep sea, thereby not only serving as food to the deep-sea animals, but leaving their husks to be preserved as fossils in deep-sea deposits. I shall refer to this latter point in considering deep-sea questions in the sequel.

"A very large species of screw-pine (*Pandanus*), with a fruit as big as a man's head, is common along the shore. *Pandanus* is a common East Indian littoral genus. The stem, though large, is soft and succulent, and hence with a small axe one can enjoy all the pleasure of felling a large tree without any fatigue. The deep cut made by a single blow is most gratifying to one's feelings of power, and having cut down one tree to obtain a specimen of the fruit, I found myself felling two or three others wantonly.

"On the island of Wokan, not far from the anchorage, sago-palms abound in the swamps. Several parties of natives from the back country were living near the shore, having come from a distance in their boats, to prepare a store of sago to take home with them.

"The trees are excessively high and large in the Aru (Arrou) forests. To a botanical collector, with no time to spare, such a forest is a hopeless problem. Only the few low-growing plants can be gathered, and the orchids and ferns that hang on the stems low down, especially along the coast. A few palms can be cut down. The flowers and fruits of the trees, the main feature of the vegetation, and those most likely to prove of special interest, are far out of reach. The trees cannot be cut down. It would take a day at least to fell one. The only hope is to lie on one's back and look for blossoms or fruit with a binocular glass, and then try and shoot a branch down. Very often, however, the trees are far too high for that, and then the matter must be given up altogether.

"Growing on some of the high trees in Wokan Island, I saw most enormous stags'-horn ferns (*Platycerium*), which I imagined must be at least eight feet in the height of the fronds; I could only reach very small specimens.

"A species of fig, a wide-spreading tree with large leaves, seemed to me remarkable, because the fruit was borne only on the pendent aerial roots. A tree of another species of fig amused me, because its pendent roots had wound spirally around the parent stem of the tree itself, and had nearly choked it. It seemed just that a fig, so accustomed to choking other trees, should thus once in a while choke itself; but no doubt the trees suffered little, the roots taking fully the place of the strangled trunk.

"The rattans are a serious obstacle in excursions in the forests. The tendrils of these trailing and climbing palms are beset with rows of recurved hooks, which as they are drawn across one's flesh, in a dash made to get a shot at a bird, cut into it as readily as knives, but make a more unpleasant wound.

"An immense tree, with a tall stem free from branches, until at a great height it spread out into a wide and evenly-shaped crown, was full of the nests of the metallic starling (*Calornis metallica*); a very beautiful small starling with dark plumage, which displays a brilliant purple metallic glance all over its surface. The birds breed thus gregariously. There must have been three or four hundred nests in the tree; every available branch was full of them. The birds were busy flying to and fro, and were quite safe, for the tree was so high that they were out of shot of my gun at least, which was not a choke-bore.

"The main island, as viewed from seawards, is seen to be densely wooded everywhere. Along the summits of the ridges cocoanut-palms show out against the sky, accompanied by areca-palms, as can be made out on a nearer view. The general dark-green mass of vegetation on the hillsides is festooned with creepers, and the smaller outlying islands dotted about in front of the main island are all thickly wooded. The inhabited ones are distinguished at once by the large number of cocoa-nut-trees growing upon them and forming the main feature of their vegetation. I landed twice upon the mainland. The trees where the shore is not swampy overhang the sea with immense horizontal branches. The bases of many of the trunks of these trees are constantly washed by the waves; but they nevertheless have large woody fungi growing upon them, sometimes attached so low down that they are frequently immersed in salt water. The overhanging branches are loaded with a thick growth of epiphytes; and I had to wade up to my middle in the sea in order to collect specimens of orchids and ferns which hung often only a couple of feet above the water. In other places the shore is swampy, and is either covered with mangroves, or with a dense growth of high trees with tall straight trunks, so closely set that it was very sensibly dark beneath them. In such a grove near Pigeon Island, a small outlier near the anchorage, whilst the ground beneath is bare and muddy, and beset with the bare roots of the trees, the trunks of the trees and fallen logs are covered with a most luxuriant growth of feathery mosses and *Jungermanniæ*. On one of these tree-trunks I found a very curious and rare fern, known before only from Samoa and New Caledonia (*Trichomanes peltatum*). The fronds of the fern are circular in form, and, connected by a slender rhizome, adhere in rows to the bark. They are pressed absolutely flat against the bark, so as to look like an adherent crust, and have all the appearance of a *Riccia* or some such liverwort, for which indeed I took them, as I gathered specimens by shaving off the bark. A species of adders'-tongue fern (*Ophioglossum pendulum*), unlike our humble little English form, grows in abundance, attached to tree stems with long pendulous fronds as much as a yard in length."

Ki Island, as described by Wallace,[1] is very rugged and mountainous, the mountains rising to a height of three or four thousand feet, and being everywhere covered with a lofty, dense, unbroken forest, like the low, flat Arrou. Further particulars respecting the botany and physical features of this and the other islands are wanting.

Little or nothing beyond the foregoing extracts seems to have been published on the botany of the islands under consideration;[2] even in Miquel's Flora Indiæ Batavæ, which professedly includes them, they are very rarely mentioned, if at all, in the distribution of the species; Amboina, Ceram, and Timor, on the other hand, being commonly cited. Indeed, the flora of the first-named island forms the foundation of the great illustrated Herbarium Amboinense of Rumpf, which was written during the latter part of the seventeenth century, and published about the middle of the eighteenth. It is one of the few pre-Linnean works commonly cited in modern publications. The botany of Timor is also tolerably well known, and forms the subject of a special treatise[3] by the late Professor Decaisne, based upon collections made by the naturalists of various French expeditions. For purposes of comparisons the statistics of this flora will be given below.

[1] Malay Archipelago, p. 176 *et seq.*, London, 1869.

[2] A number of plants published by Dr Ed. Beccari had been overlooked: a list is added at p. 223 *et seq.*

[3] Herbarii Timorensis Descriptio.

The following table includes those flowering plants from the South-eastern Moluccas contained in the collections made by Moseley, Riedel, and Forbes which could be identified with some degree of certainty. It is intended to show their distribution outside of the Archipelago, their distribution within being given in more or less detail under each species in the enumeration which follows. Mauritius, Bourbon, and Madagascar are regarded as belonging to the African area; and Polynesia includes all the Pacific Islands eastward of the Philippines, New Guinea, and Australia, though as a matter of fact very few of the plants are recorded as Polynesian which do not extend as far eastward as the Fijis.

TABLE *exhibiting the Distribution of the Flowering Plants of the South-eastern Moluccas.*

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
RANUNCULACEÆ.					
Naravelia zeylanica	×	...	...	...	...
ANONACEÆ.					
Popowia filipes	...	...	...	...	...
MENISPERMACEÆ.					
Anamirta cocculus	×	...	...	...	...
Stephania rotunda	×	...	...	...	...
Cissampelos pareira	×	...	×	×	×
PAPAVERACEÆ.					
Argemone mexicana	×	...	...	×	×
CRUCIFERÆ.					
Brassica juncea	×	...	...	×	...
CAPPARIDEÆ.					
Polanisia viscosa	×	...	×	×	×
Gynandropsis pentaphylla	×	...	...	×	×
Capparis sepiaria	×	...	...	...	...
Capparis spinosa	×	×	...	×	...
VIOLARIEÆ.					
Ionidium suffruticosum	×	...	×	×	...
PITTOSPOREÆ.					
Pittosporum revolutum	...	...	×	...	...
PORTULACEÆ.					
Portulaca oleracea	×	×	×	×	×
GUTTIFERÆ.					
Ochrocarpus ovalifolius	...	×	...	...	...
Calophyllum inophyllum	×	×	×	×	...
DIPTEROCARPEÆ.					
Vateria papuana	...	×	...	...	...
MALVACEÆ.					
Sida rhombifolia	×	×	×	×	×
Sida carpinifolia	×	...	...	×	×
Sida humilis	×	...	...	×	×
Abutilon indicum	×	...	×	×	×
Abutilon graveolens	×	...	×	×	×

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Urena lobata	×	×	×	×	×
Hibiscus rosa-sinensis	×	×	...	...	...
Hibiscus surattensis	×	...	...	×	...
Hibiscus tetraphyllus	×	...	...	...	...
Hibiscus vitifolius	×	...	×	×	×
Hibiscus virgatus	...	...	...	...	...
Hibiscus tiliaceus	×	×	×	×	×
Thespesia populnea	×	×	×	×	×
Thespesia lampas	×	...	...	×	...
Gossypium barbadense	×	×	...	×	×
Gossypium herbaceum	×	...	...	×	×
Bombax insigne	×	...	...	...	...
STERCULIACEÆ.					
Sterculia fœtida	×	...	×	×	...
Heritiera littoralis	×	×	×	×	...
Kleinhovia hospita	×	×	...	×	×
Helicteres isora	×	...	×	...	...
Melochia velutina	×	...	...	...	...
Melochia odorata	...	×	...	...	...
TILIACEÆ.					
Brownlowia riedelii	...	...	...	...	...
Triumfetta rhomboidea	×	...	...	×	×
Triumfetta annua	×	...	...	×	...
Corchorus olitorius	×	×	×	×	×
Corchorus acutangulus	×	...	×	×	×
Corchorus trilocularis	×	...	×	×	...
MALPIGHIACEÆ.					
Ryssopterys timorensis	...	...	×	...	...
Tristellateia australasica	×	...	×	...	...
ZYGOPHYLLEÆ.					
Tribulus cistoides	×	×	×	×	×
GERANIACEÆ.					
Averrhoa carambola	×	...	...	...	×
RUTACEÆ.					
Glycosmis pentaphylla	×	×	×	...	...
Micromelum pubescens	×	×	×	...	...
Murraya exotica	×	...	×	...	...
Atalantia nitida	...	...	...	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
SIMARUBEÆ.					
Suriana maritima	×	×	×	×	×
Harrisonia brownii	...	...	×	...	...
MELIACEÆ.					
Aglaia elæagnoides	...	×	×	...	...
Owenia cerasifera	...	...	×	...	...
Carapa moluccensis	×	×	×	×	...
OLACINEÆ.					
Cardiopteris lobata	×	...	...	...	...
Ximenia americana	×	×	×	×	×
CELASTRINEÆ.					
Euonymus javanicus	...	...	...	...	...
Gymnosporia montana	×	...	×	×	...
Hippocratea grahami	×	...	...	...	...
RHAMNEÆ.					
Smythea pacifica	...	×	...	...	...
Alphitonia excelsa	...	×	×	...	...
Gouania microcarpa	×	...	...	...	...
AMPELIDEÆ.					
Vitis repens	×	...	...	...	...
Vitis tenuifolia	×	...	...	...	...
Leea sambucina	×	×	×	×	...
Leea æquata	×	×	...	...	...
SAPINDACEÆ.					
Erioglossum edule	×	...	×	...	...
Allophylus cobbe	×	...	×	...	...
Schleichera trijuga	×	...	...	...	...
Dodonæa viscosa	×	×	×	×	×
ANACARDIACEÆ.					
Buchanania angustifolia	×	...	×	...	...
Buchanania arborescens	...	...	...	...	...
Semecarpus heterophyllus	...	...	...	...	...
MORINGEÆ.					
Moringa pterygosperma	×	...	...	...	...
LEGUMINOSÆ.					
Crotalaria linifolia	×	...	×	...	...
Crotalaria sericea	×	×	...	...	...
Indigofera anil	×	×	...	×	×
Indigofera linifolia	×	...	×	×	...
Tephrosia purpurea	×	×	×	×	×
Sesbania grandiflora	×	×	×	×	...
Sesbania aculeata	×	×	×	×	×
Desmodium gangeticum	×	...	×	×	×
Desmodium latifolium	×	...	...	×	×
Desmodium polycarpum	×	×	×	×	...
Desmodium laxiflorum	×	...	...	...	...
Desmodium ormocarpoides	×	...	...	...	...
Desmodium umbellatum	×	×	×	×	×
Uraria crinita	×	...	...	...	...
Phylacium bracteosum	...	...	...	...	...
Abrus precatorius	×	×	×	×	×
Clitoria ternatea	×	×	...	×	×

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Mucuna pruriens	×	...	×	×	×
Mucuna bracteata	×	...	...	...	...
Galactia tenuiflora	×	...	×	×	×
Canavalia ensiformis	×	...	...	×	×
Canavalia obtusifolia	×	×	×	×	×
Vigna lutea	×	×	×	×	×
Vigna luteola	×	...	×	×	×
Psophocarpus tetragonolobus	×	...	...	...	...
Dolichos lablab	×	×	...	×	×
Cajanus indicus	×	...	...	×	×
Flemingia strobilifera	×	...	...	×	×
Derris uliginosa	×	×	×	×	...
Pongamia glabra	×	×	×	×	...
Inocarpus edulis	...	×	...	...	...
Sophora tomentosa	×	×	×	×	×
Peltophorum ferrugineum	×	...	×	...	...
Cæsalpinia nuga	×	×	×	...	...
Cæsalpinia pulcherrima	×	×	...	×	×
Cæsalpinia bonducella	×	×	×	×	×
Cassia fistula	×	...	...	×	×
Cassia alata	×	...	...	×	×
Cassia javanica	...	...	...	...	...
Cassia sophera	×	×	×	×	×
Cassia tora	×	...	×	×	×
Cassia megalantha	...	...	...	...	...
Cassia mimosoides	×	...	×	×	×
Bauhinia blancoi	×	...	...	...	...
Cynometra ramiflora	×	...	×	...	...
Entada scandens	×	×	×	×	×
Dichrostachys nutans	...	...	×	×	...
Acacia farnesiana	×	×	×	×	×
ROSACEÆ.					
Rubus glomeratus	×	...	...	...	...
CRASSULACEÆ.					
Bryophyllum calycinum	×	...	...	×	×
RHIZOPHOREÆ.					
Rhizophora mucronata	×	×	×	×	...
Bruguiera rheedii	×	×	×	×	...
Bruguiera caryophylloides	×	...	...	...	...
COMBRETACEÆ.					
Lumnitzera coccinea	×	×	×	...	...
Gyrocarpus jacquini	×	×	×	×	×
MYRTACEÆ.					
Melaleuca leucadendron	×	...	×	...	...
Rhodomyrtus macrocarpa	...	...	×	...	...
Nelitris paniculata	×	...	×	...	...
Eugenia javanica	×	...	...	...	...
Eugenia malaccensis	×	...	...	...	×
Barringtonia speciosa	×	×	×	×	...
Barringtonia racemosa	×	×	...	×	...
LYTHRARIEÆ.					
Pemphis acidula	×	×	×	×	...
CUCURBITACEÆ.					
Luffa ægyptiaca	×	×	×	×	×

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Citrullus vulgaris	×	×	...	×	×
Momordica charantia	×	×	...	×	×
Lagenaria vulgaris	×	×	×	×	×
Cucumis trigonus	×	...	×	...	×
FICOIDEÆ.					
Sesuvium portulacastrum	×	×	×	×	×
UMBELLIFERÆ.					
Carum roxburghianum	×	...	...	...	...
ARALIACEÆ.					
Heptapleurum venulosum	×	...	×	...	...
RUBIACEÆ.					
Oldenlandia paniculata	×	×	...	...	...
Webera dallachiana	...	...	×	...	...
Guettarda speciosa	×	×	×	×	...
Ixora grandifolia	×	...	...	...	...
Ixora timorensis	...	...	×	...	...
Ixora paludosa	...	...	...	...	...
Pavetta indica	×	...	×	...	...
Coffea bengalensis	×	...	...	...	...
Morinda citrifolia	×	×	×	×	×
Morinda bracteata	×	...	...	...	...
COMPOSITÆ.					
Vernonia cinerea	×	...	×	×	...
Vernonia chinensis	×	...	...	...	...
Adenostemma viscosum	×	×	×	×	×
Ageratum conyzoides	×	×	×	×	×
Blumea laciniata	×	...	...	...	...
Blumea lacera	×	×	×	×	...
Blumea membranacea	×	...	...	...	...
Blumea balsamifera	×	...	...	...	...
Blumea wightiana	×	...	×	×	...
Pluchea indica	×	...	×	...	...
Wedelia biflora	×	×	×	×	...
Bidens pilosa	×	×	×	×	×
Emilia sonchifolia	×	...	...	×	×
GOODENOVIEÆ.					
Scævola kœnigii	×	×	×	...	...
PLUMBAGINEÆ.					
Ægialitis annulata	...	...	×	...	...
Plumbago zeylanica	×	×	×	×	...
MYRSINEÆ.					
Mæsa nemoralis	...	×	...	...	...
SAPOTACEÆ.					
Mimusops kauki	×	...	×	...	...
EBENACEÆ.					
Diospyros maritima	...	...	×	...	...
OLEACEÆ.					
Jasminum sambac	×	...	...	...	...
Jasminum didymum	...	×	×	...	...
Jasminum lancifolium	...	...	...	...	...
Linociera ramiflora	×	...	×	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
APOCYNACEÆ.					
Rauwolfia amsoniæfolia	...	...	...	...	...
Cerbera odollam	×	×	×	...	...
Ochrosia borbonica	×	...	...	×	...
Plumeria acutifolia	×	...	...	...	×
Tabernæmontana orientalis	×	×	×	...	...
Tabernæmontana floribunda	...	...	...	...	...
Alstonia spectabilis	...	...	...	...	...
Parsonsia spiralis	×	×	...	...	...
Wrightia calycina	...	...	...	...	...
Anodendron paniculatum	×	...	...	...	...
ASCLEPIADEÆ.					
Calotropis gigantea	×	...	...	...	...
Asclepias curassavica	×	×	×	×	×
Ceropegia horsfieldiana	×	...	×	...	...
BORAGINEÆ.					
Cordia subcordata	×	×	×	×	...
Tournefortia argentea	×	×	×	×	...
Tournefortia sarmentosa	...	...	×	×	...
Heliotropium indicum	×	...	×	×	×
CONVOLVULACEÆ.					
Ipomœa angustifolia	×	...	×	×	...
Ipomœa vitifolia	×	...	...	...	...
Ipomœa hederacea	×	...	×	×	×
Ipomœa turpethum	×	×	×	×	...
Ipomœa glaberrima	...	×	...	×	...
Ipomœa cymosa	×	...	×	×	...
Ipomœa biloba	×	×	×	×	×
Hewittia bicolor	×	...	...	×	...
Convolvulus parviflorus	×	...	×	×	...
Cuscuta reflexa	×	...	...	...	...
SOLANACEÆ.					
Lycopersicum esculentum	×	...	...	×	×
Solanum indicum	×	...	...	...	...
Solanum verbascifolium	×	...	×	...	×
Solanum torvum	×	...	...	...	×
Physalis minima	×	...	×	×	×
Capsicum frutescens	×	...	...	×	×
Datura alba	×	...	...	×	×
Nicotiana tabacum	×	×	...	×	×
SCROPHULARINEÆ.					
Buchnera ramosissima	...	...	×	...	...
BIGNONIACEÆ.					
Dolichandrone rheedii	×	...	...	...	...
PEDALINEÆ.					
Sesamum indicum	×	...	...	×	×
Josephinia imperatricis	...	...	×	...	...
ACANTHACEÆ.					
Ruellia aruensis	...	...	...	...	...
Hemigraphis reptans	...	×	...	...	...
Hemigraphis parabolica	...	...	...	...	...
Acanthus ilicifolius	×	×	×	...	...
Barleria prionitis	×	...	...	×	...
Asystasia intrusa	×	...	...	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Eranthemum variabile	...	...	×	...	...
Eranthemum album	×	...	...	...	...
Lepidagathis hyalina	×	×	...	...	...
Lepidagathis javanica	...	...	...	...	...
Justicia gendarussa	×	...	...	×	×
Graptophyllum hortense	×	×	...	×	×
Dicliptera burmanni	×	...	...	...	...
Hypoestes floribunda	...	...	×	...	...
Myoporineæ.					
Myoporum acuminatum	...	...	×	...	...
Verbenaceæ.					
Callicarpa cana	×	...	×	...	...
Callicarpa longifolia	×	...	×	...	...
Callicarpa pedunculata	...	...	×	...	...
Clerodendron inerme	×	×	×	...	...
Clerodendron longiflorum	...	...	...	...	...
Premna integrifolia	×	...	×	...	...
Premna obtusifolia	...	...	×	...	...
Vitex trifolia	×	×	×	×	...
Vitex negundo	×	...	...	×	...
Vitex pubescens	×	...	...	...	...
Petræovitex riedelii	...	...	...	...	...
Avicennia officinalis	×	×	×	×	×
Labiatæ.					
Ocimum sanctum	×	...	×	×	...
Ocimum basilicum	×	×	...	×	...
Plectranthus parviflorus	...	×	×	...	...
Coleus scutellarioides	...	×	×	...	...
Hyptis spicigera	...	...	...	×	×
Anisomeles salviæfolia	...	...	×	...	...
Anisomeles ovata	×	...	...	...	...
Leucas javanica	...	...	...	...	...
Leucas decemdentata	...	×	...	...	...
Cymaria acuminata	...	...	...	...	...
Nyctagineæ.					
Mirabilis jalapa	×	...	...	×	×
Boerhaavia diffusa	×	×	×	×	...
Pisonia aculeata	×	×	×	×	×
Amarantaceæ.					
Deeringia celosioides	×	×	×	...	...
Deeringia altissima	...	×	×	...	...
Celosia argentea	×	...	...	×	×
Allmania albida	×	...	...	...	...
Amarantus spinosus	×	...	...	×	×
Amarantus caudatus	×	...	...	×	...
Amarantus viridis	×	×	×	×	×
Pupalia lappacea	×	...	...	×	...
Achyranthes aspera	×	×	×	×	×
Nothosærua brachiata	×	...	...	×	...
Gomphrena globosa	×	×	...	×	×
Gomphrena canescens	...	...	×	...	...
Chenopodiaceæ.					
Salsola kali	×	×	×	×	×
Aristolochiaceæ.					
Aristolochia indica	×	...	×	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Myristiceæ.					
Myristica insipida	...	...	×	...	...
Laurineæ.					
Cassytha filiformis	×	×	×	×	×
Hernandia peltata	×	×	×	×	...
Proteaceæ.					
Grevillea gibbosa	...	...	×	...	...
Loranthaceæ.					
Loranthus longiflorus	×	...	×	...	...
Santalaceæ.					
Exocarpus latifolia	...	...	×	...	...
Euphorbiaceæ.					
Euphorbia atoto	×	×	×	...	...
Euphorbia antiquorum	×	...	...	...	...
Euphorbia pilulifera	×	×	×	×	×
Phyllanthus reticulatus	×	...	×	×	×
Phyllanthus niruri	×	×	...	×	×
Phyllanthus diversifolius	×	...	...	...	...
Breynia fruticosa	×	...	...	...	...
Jatropha curcas	×	×	...	×	×
Aleurites moluccana	×	×	×	×	...
Codiæum variegatum	...	×	...	...	...
Manihot utilissima	×	×	...	×	×
Claoxylon rubescens	...	...	...	...	...
Acalypha grandis	...	×	...	...	...
Acalypha pancheriana	...	×	...	...	...
Acalypha indica	×	...	...	...	...
Mallotus ricinoides	×	...	×	...	...
Mallotus philippinensis	×	...	×	...	...
Mallotus muricatus	×	...	...	...	...
Mallotus albus	×	...	...	...	...
Mallotus moluccanus	...	×	...	...	...
Mallotus repandus	×	×	×	...	...
Macaranga tanarius	×	×	×	...	...
Macaranga involucrata	...	...	×	...	...
Ricinus communis	×	×	×	×	×
Gelonium bifarium	...	...	×	...	...
Carumbium populifolium	...	×	×	...	...
Excæcaria agallocha	×	×	×	...	...
Urticaceæ.					
Celtis paniculata	...	×	×	...	...
Trema timorensis	...	...	...	...	...
Trema angustifolia	×	...	...	...	...
Fatoua pilosa	×	×	×	...	...
Ficus pilosa	...	...	×	...	...
Ficus retusa	×	...	×	...	...
Ficus benjamina	×	...	×	...	...
Ficus quercifolia	...	...	...	...	...
Ficus ampelas	...	...	...	...	...
Ficus rostrata	...	...	...	...	...
Ficus decaisneana	...	...	...	...	...
Ficus fistulosa	×	...	...	...	...
Ficus ribes	...	...	...	...	...
Ficus magnifolia	...	...	×	...	...
Ficus pumila	×	...	...	...	...
Fleurya interrupta	×	×	×	×	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Laportea crenulata	×	...	...	...	...
Procris pedunculata	...	×	...	×	...
Pouzolzia pentandra	×	...	...	...	...
Pipturus argenteus	...	×	×	...	...
Pipturus velutinus	...	×	...	...	...
Leucosyke capitellata	...	×	...	...	...
Casuarineæ.					
Casuarina equisetifolia	×	×	×	×	×
Gnetaceæ.					
Gnetum scandens	×	...	...	...	...
Hydrocharideæ.					
Enhalus acoroides	×	...	×	×	...
Halophila ovalis	×	×	×	×	...
Orchideæ.					
Dendrobium phalænopsis	...	...	...	...	...
Phalænopsis amabilis	...	...	...	...	...
Vanda lissochiloides	...	...	...	...	...
Scitamineæ.					
Riedelia curviflora	...	...	...	...	...
Clinogyne grandis	...	...	...	×	...
Amaryllideæ.					
Eurycles amboinensis	...	...	×	...	...
Crinum pedunculatum	...	...	×	...	...
Crinum asiaticum	×	×	×	...	...
Taccaceæ.					
Tacca pinnatifida	×	×	×	×	...
Liliaceæ.					
Dracæna angustifolia	×	...	×	...	...
Cordyline terminalis	×	×	×	...	...
Dianella ensifolia	×	×	×	×	...
Commelinaceæ.					
Pollia sorzogonensis	×	×	...	...	...
Commelina nudiflora	×	×	×	×	×
Flagellarieæ.					
Flagellaria indica	×	×	×	×	...
Palmæ.					
Cocos nucifera	×	×	×	×	×
Nipa fruticans	×	...	×	...	...
Naiadaceæ.					
Zostera nana	...	...	×	×	...
Cyperaceæ.					
Cyperus ferax	×	×	×	×	×
Cyperus pennatus	×	×	×	×	...
Gramineæ.					
Panicum sanguinale	×	×	×	×	×
Setaria macrostachya	×	...	×	...	×
Setaria verticillata	×	×	×	×	×
Cenchrus calyculatus	...	×	...	...	...
Stenotaphrum subulatum	...	×	...	×	...
Spinifex squarrosus	×	...	...	...	...
Spinifex fragilis	...	...	×	...	...
Coix lachryma	×	×	...	×	×
Imperata arundinacea	×	×	×	×	×
Anthistiria gigantea	×	...	...	...	...
Eleusine indica	×	×	×	×	×
Centotheca lappacea	×	×	×	×	...
Cycadeæ.					
Cycas circinalis	×	×	...	×	...

An analysis of the foregoing table yields some interesting facts. Thus the 367 species belong to 263 genera, giving barely 1·4 species per genus; and the 263 genera belong to eighty-three natural Orders, or about 3·2 genera per Order.

Out of 263 genera, 205 are represented by only one species each, and 39 are represented by two each. The genera numbering more than two species are:—*Sida*, 3; *Hibiscus*, 6; *Corchorus*, 3; *Desmodium*, 6; *Cæsalpinia*, 3; *Cassia*, 7; *Ixora*, 3; *Blumea*, 5; *Jasminum*, 3; *Ipomœa*, 7; *Solanum*, 3; *Callicarpa*, 3; *Vitex*, 3; *Amarantus*, 3; *Euphorbia*, 3; *Phyllanthus*, 3; *Acalypha*, 3; *Mallotus*, 6; and *Ficus*, 11.

Out of 83 natural Orders, 35 are represented by only one genus and one species each, while the following thirteen natural Orders comprise ten or more species each:—

Leguminosæ	48	Compositæ	13	Rubiaceæ	10
Euphorbiaceæ	27	Verbenaceæ	12	Apocynaceæ	10
Urticaceæ	22	Amarantaceæ	12	Labiatæ	10
Malvaceæ	17	Gramineæ	12	Convolvulaceæ	10
Acanthaceæ	14				

The relatively large proportion of Leguminosæ, amounting to over 13 per cent. of the whole, may be accounted for partly by the fact that several of the species of this Order are commonly cultivated, and have thereby become so widely diffused in a wild state, and partly by the fact that the seeds of many members of this Order will bear long immersion in sea water without losing their vitality, and often germinate when cast ashore after having been conveyed long distances by oceanic currents.

With regard to the proportions of the various natural Orders, it is very probable that an analysis of the complete flora of these islands would give very different results, for we know that the present collections are almost entirely composed of the littoral element. Nevertheless, the analysis given by Decaisne[1] of the flora of Timor offers very similar proportions. The total number of species enumerated by Decaisne is 550, whereof 100 are monocotyledons and ferns, leaving 450 dicotyledons, representing a large number of genera and natural Orders; the Orders (including ferns) most numerously represented being:—

Leguminosæ	63	Cyperaceæ	20	Buettneriaceæ[2]	13
Gramineæ	33	Malvaceæ	18	Myrtaceæ	12
Euphorbiaceæ	28	Acanthaceæ	17	Verbenaceæ	12
Urticaceæ	26	Convolvulaceæ	15	Solanaceæ	11
Compositæ	24	Rubiaceæ	14	Labiatæ	11
Filices	22				

It will be seen that the natural Orders are nearly the same in the two instances. Ferns, if included, would occupy a similar position in our flora. Taking the other Orders not among ours, represented by ten or more species, the numbers are:—Myrtaceæ, 7; Buettneriaceæ, 0; Solanaceæ, 8; and Cyperaceæ, 2; in the present collection from the South-eastern Moluccas. Of these Orders the Cyperaceæ are perhaps the likeliest to receive a considerable accession to the present number in future collections. It should be mentioned that Decaisne retains the Artocarpeæ as a distinct Order from the Urticaceæ, and of the former he describes thirteen species, eleven of *Ficus* and two of *Artocarpus*.

Examining the distribution of the plants in the foregoing table, we find that out of the 367, 274, or about 74·7 per cent., extend to Continental Asia; 193, or about 52·6 per cent., to Australia; 165, or nearly 45 per cent., to Africa; 137, or 37 per cent., to Polynesia; and 107, or 29 per cent., to America. Taking the Malayan Archipelago as one geographical area or region, 35 out of the 367 are restricted to it; in other words, 332 out of 367 extend to one or more of the other geographical areas. The number extending to three areas is 227; while 165 are spread over four areas, and 109 over five areas. Finally, 48 of the species, or 13 per cent., occur in all six areas. These are:—

Portulaca oleracea, Sida rhombifolia, Urena lobata, Hibiscus tiliaceus, Thespesia

[1] Herbarii Timorensis Descriptio, p. 8.

[2] A tribe of Sterculiaceæ, not represented in our collections.

populnea, Corchorus olitorius, Tribulus cistoides, Suriana maritima, Ximenia americana, Dodonæa viscosa, Tephrosia purpurea, Sesbania aculeata, Desmodium umbellatum, Abrus precatorius, Canavalia obtusifolia, Vigna lutea, Sophora tomentosa, Cæsalpinia bonducella, Cassia sophera, Entada scandens, Acacia farnesiana, Gyrocarpus jacquini, Luffa ægyptiaca, Lagenaria vulgaris, Sesuvium portulacastrum, Morinda citrifolia, Adenostemma viscosum, Ageratum conyzoides, Bidens pilosa, Asclepias curassavica, Ipomœa biloba, Avicennia officinalis, Boerhaavia diffusa, Pisonia aculeata, Amarantus viridis, Achyranthes aspera, Salsola kali, Cassytha filiformis, Euphorbia pilulifera, Ricinus communis, Casuarina equisetifolia, Commelina nudiflora, Cocos nucifera, Cyperus ferax, Panicum sanguinale, Setaria verticillata, Imperata arundinacea, and *Eleusine indica.*

Three of these 47 also occur in the south of Europe, namely, *Portulaca oleracea, Amarantus viridis,* and *Salsola kali.*

The present general diffusion of these plants is due to a variety of causes, of which there are two primary ones, namely, cultivation and natural dispersion; the latter including every agency, except that arising out of the direct or indirect interference of man. The plants owing their wide range to cultivation fall into two categories—the cultivated plants, and those associated with them and commonly designated weeds. *Lagenaria vulgaris* and *Canavalia obtusifolia* are examples of the former category, and *Amarantus viridis* and *Euphorbia pilulifera* of the latter; while *Suriana maritima* and *Gyrocarpus jacquini* have perhaps as certainly been dispersed independently of the operations of man. Further particulars of the distribution and probable means of dispersion are given under many of the species in the body of the work.

The following lists of plants from remote oceanic islands show more clearly the cosmopolitan character of the littoral flora of the South-eastern Moluccas than mere words can do.

List of Plants from the Keeling or Cocos Islands, collected by the late C. DARWIN *in* 1836.

Hibiscus tiliaceus, Linn.	*Dicliptera burmanni,* Nees ?
Triumfetta procumbens, Forst.	*Ochrosia parviflora,* Hensl.
Pemphis acidula, Forst.	*Boerhaavia diffusa,* Willd.
Portulaca oleracea, Linn.	*Achyranthes argentea,* Lam. ?
Cæsalpinia bonduc, Roxb.	*Urera gaudichauduana,* Hensl.
Acacia farnesiana, Linn. ?	*Panicum sanguinale,* Linn. ?
Scævola kœnigii, Vahl.	*Stenotaphrum lepturoide,* Hensl.
Guettarda speciosa, Linn.	*Lepturus repens,* Forst.
Cordia orientalis, R. Br.	*Cocos nucifera,* Linn.
Tournefortia argentea, Linn.	

The Keeling or Cocos Islands are situated in the Indian Ocean in about 12° S. latitude, and 98° E. longitude. They are low coral formations, and the largest is about five miles long, and a quarter of a mile broad, and the group is about six hundred miles distant from the nearest land. The above list was published[1] by the late Professor

[1] *Ann. Nat. Hist.*, i. p. 337, 1838.

Henslow, who regarded two of the plants as new species. We have not seen the specimens, but from the description and figure of *Stenotaphrum lepturoide* we believe it is nothing more than *Stenotaphrum americanum*, Schrank, which is a common littoral grass in the tropical regions of both hemispheres, and not very different from the *Stenotaphrum subulatum* of our list. And *Urera gaudichaudiana*, Hensl., is treated by Weddell[1] as a variety of the widely spread *Fleurya æstuans*, Gaud. The *Cæsalpinia* may be correctly named, or it may be the much commoner *Cæsalpinia bonducella*, for the two species have been much confused; though both doubtless owe their wide dispersion in part, at least, to oceanic currents. *Triumfetta procumbens* is a common seaside plant in the Archipelago and Polynesia, and is also found on the coast of North-eastern Australia. *Cordia orientalis* is a synonym of the *Cordia subcordata* of our list. *Ochrosia parviflora*, Hensl. (*Cerbera parviflora*, Forst.), is a common seaside tree in the Pacific Islands, and also occurs in North-eastern Australia. *Achyranthes argentea* is a variety of *Achyranthes aspera*, rather than a distinct species, and *Lepturus repens* is a common Polynesian and Australian littoral grass.

Darwin's sketch of the vegetation of the Keeling Islands[2] merits reproducing here, as it conveys a good idea of the aspect of the coral islands:—

"The cocoanut-tree at the first glance seems to compose the whole wood; there are, however, five or six other trees. One of these grows to a very large size, but from the extreme softness of its wood is useless; another sort affords excellent timber for ship-building. Besides the trees, the number of plants is exceedingly limited, and consists of insignificant weeds. In my collection, which includes, I believe, nearly the perfect flora, there are twenty species, without reckoning a moss,[3] lichen,[4] and fungus.[5] To this number two trees must be added, one of which was not in flower, and the other I only heard of. The latter is a solitary tree of its kind, and grows near the beach, where, without doubt, the one seed was thrown up by the waves. A *Guilandina* also grows on only one of the islets. I do not include in the above list the sugar-cane, banana, some other vegetables, fruit-trees, and imported grasses. As the islands consist entirely of coral, and at one time must have existed as mere water-washed reefs, all their terrestrial productions must have been transported here by the waves of the sea. In accordance with this, the florula has quite the character of a refuge for the destitute. Professor Henslow informs me that of the twenty species, nineteen belong to different genera, and these again to no less than sixteen families.

"In Holman's Travels,[6] an account is given, on the authority of Mr A. S. Keating, who resided twelve months on these islands, of the various seeds and other bodies which have been known to have been washed on shore: 'Seeds and plants from Sumatra and Java have been driven up by the surf on the windward side of the islands. Among them have been found the Kimiri, native of Sumatra and the peninsula of Malacca; the cocoanut of Balci, known by its shape and size; the

[1] DC., Prodr., xvi. 1, p. 72.

[2] Journal of Researches during the voyage of H.M.S. "Beagle," p. 454, Lond. Ed., 1879.

[3] *Hypnum fuscescens*, Hook. et Arn., not *Hypnum rufescens*, Hook., as by mistake appears in Henslow's paper. The former is a Polynesian species, while the latter inhabits Alpine situations in Europe.

[4] Not included in Henslow's paper. [5] *Polyporus lucidus*, Fries. [6] Holman's Travels, iv. p. 378.

Dadass, which is planted by the Malays with the pepper-vine, the latter entwining round its trunk, and supporting itself by the prickles on its stem; the soap-tree, the castor-oil plant, trunks of the sago-palm, and various kinds of seeds unknown to the Malays settled on the islands. These are all supposed to have been driven by the north-west monsoon to the coast of Australia, and thence to these islands by the south-east trade-wind. Large masses of Java teak and yellow wood have also been found, besides immense trees of red and white cedar, and the blue gumwood of Australia, in a perfectly sound condition. All the hardy seeds, such as creepers, retain their germinating power, but the softer kinds, among which is the mangostin, are destroyed in the passage. Fishing-canoes, apparently from Java, have at times been washed on shore.' It is interesting thus to discover how numerous the seeds are, which, coming from several countries, are drifted over the wide ocean. Professor Henslow tells me he believes that nearly all the plants which I brought from these islands are common littoral species in the East Indian Archipelago.[1] From the direction, however, of the winds and currents, it seems scarcely possible that they could have come here in a direct line. If, as suggested with much probability by Mr Keating, they were first carried towards the coast of Australia, and thence drifted back together with the productions of that country, the seeds before germinating must have travelled between 1800 and 2400 miles.

"Chamisso,[2] when describing the Radack Archipelago, situated in the western part of the Pacific, states that 'the sea brings to these islands the seeds and fruits of many trees, most of which have yet not grown here. The greater part of these seeds appear to have not yet lost the capability of growing.' It is also said that palms and bamboos from somewhere in the torrid zone, and trunks of northern firs, are washed on shore. These firs must have come from an immense distance. These facts are highly interesting. It cannot be doubted that if there were land-birds to pick up the seeds when first cast on shore, and a soil better adapted for their growth than the loose blocks of coral, that the most isolated of the lagoon islands would in time possess a far more abundant flora than they now have."

Another example of littoral vegetation in the Indian Ocean is afforded by a small collection in the Kew Herbarium from Diego Garcia in the Chagos Islands, recently contributed by A. Hume, Esq., R.N.

List of Plants from Diego Garcia, Chagos Islands.

Portulaca quadrifida, Linn.	*Vernonia cinerea*, Less.
Sida diffusa, H. B. et K.	*Asclepias curassavica*, Linn.
Triumfetta procumbens, Forst.	*Striga hirsuta*, Lour.
Triphasia trifoliata, DC.	*Stachytarpheta indica*, Vahl.
Suriana maritima, Linn.	*Achyranthes velutina*, H. et A.
Barringtonia speciosa, Linn.	*Rivina lævis*, Linn.
Passiflora suberosa, Linn.	*Euphorbia pilulifera*, Linn.
Guettarda speciosa, Linn.	*Phyllanthus niruri*, Linn. ?

The Chagos Islands are in nearly the same latitude as the Seychelles, but about eighteen degrees to the eastward of them. Whether, associated with the common plants in the above list, there is an endemic element as in Rodriguez and in the granitic Seychelles, is not known. The remarkable feature in the vegetation of the Seychelles is the number of endemic palms. Although palms exist in other oceanic islands, nowhere else in the world,

[1] A comparison with our data fully corroborates this.—W. B. H. [2] Kotzebue's First Voyage, iii. p. 155.

probably, is there so large a number of peculiar types in so small an area; there being no fewer than six monotypic genera of palms restricted to these small islands.

Most of the plants collected by Hume in Diego Garcia are also in the collections from the South-eastern Moluccas, and those which are not are all widely spread species. The only other plant we have seen from the island is an endemic fern, *Asplenium æquabile*, Baker, a distinct species sent to Kew some years ago by Lady Barkly.

In the body of the present work full details are given of the distribution of many plants which extend to Polynesia, especially such as reach the more remote islands. For purposes of comparison, and as a specimen of the botany of some of the smaller Pacific islands lying thousands of miles apart, the following lists of plants recently collected are interesting. Associated with a number of common littoral plants are a few peculiar to the region. Such are, *Lepidium piscidium*, *Heliotropium anomalum*, and *Timonius forsteri*.

List of Plants from Rarotonga, collected by Rev. W. Wyatt Gill, *communicated by* A. W. Franks, Esq.

Alphitonia excelsa, Reiss.
Inocarpus edulis, Forst.
Melastoma denticulatum, Labill.
Mussænda frondosa, Linn.
Vitex trifolia, Linn.
Ficus tinctoria, Forst.?
Centotheca lappacea, Beauv.

List of Plants collected in the Pacific Islands by J. T. Arundel, Esq.

Lepidium piscidium, Forst.	Fanning; Starbuck; Suwarrow.
Portulaca oleracea, Linn.	Fanning.
Triumfetta procumbens, Forst.	Fanning; Suwarrow; Palmerston; Enderbury; Mary or Canton.
Sida fallax, Walp.	Fanning; Starbuck; Enderbury; Mary; Hull; Gardner.
Thespesia populnea, Corr.	Enderbury.
Tribulus cistoides, Linn.	Sydney.
Cassia occidentalis, Linn.	Fanning.
Barringtonia speciosa, Linn. f.	Ducie.
Guettarda speciosa, Linn.	Hull; Gardner.
Pemphis acidula, Forst.	Palmerston; Hull.
Asclepias curassavica, Linn.	Fanning.
Heliotropium anomalum, H. et A.	Fanning; Palmerston.
Tournefortia argentea, Linn. f.	Ducie.
Nicotiana tabacum, Linn.	Fanning.
Ipomœa grandiflora, Lam.	Fanning; Suwarrow; Enderbury; Mary; Hull; Gardner; Sydney.
Achyranthes aspera, Linn.	Fanning.
Timonius forsteri, DC.	Palmerston.
Boerhaavia tetrandra, Forst.	Fanning; Suwarrow; Enderbury; Hull; Phœnix; Mary.
Hernandia peltata, Meissn.	Not localised.
Euphorbia pilulifera, Linn.	Fanning; Suwarrow.
Ficus sp.	Fanning.
Fleurya ruderalis, Gaud.?	Fanning; Suwarrow; Enderbury; Hull; Gardner.
Lepturus repens, R. Br.	Fanning.

As every one is not familiar with the positions of the above-named islands, they may be roughly indicated, for some of the more remote ones are separated from each other by about fifty degrees of longitude and twenty-five degrees of latitude. Rarotonga, of the Hervey or Cook group, in about 160° W. longitude and 21° 5′ S. latitude, is comparatively familiar to readers of travel; Palmerston lies to the north-west in the same group. Mary, Hull, Gardner, Sydney, Phœnix, and Enderbury are in the Phœnix group, the centre of which is in about 175° W. longitude and 4° S. latitude. Fanning lies in about 4° N. and 159° W.; Starbuck in about 5° S. and 156° W.; Suwarrow in about 12° 50′ S. and 164° W.; and Ducie in about 25° S. and 125° W. The last named is, with the exception of Easter Island, the nearest to America of the southern islands of Polynesia, from which, however, it is distant more than fifty degrees.

In addition to the plants in the collection from the South-eastern Moluccas, both Wallace and Moseley mention four or five others which are characteristic of the region, and doubtless in places constitute a considerable proportion of the vegetation. They are:— Bamboo (*Bambusa* sp.), Rattans (*Calamus* spp.), Screw-pines (*Pandanus* spp.), Cocoanut (*Cocos nucifera*), and the Nipa-palm (*Nipa fruticans*); all of which, except *Cocos*, are exclusively Old World genera, or only extend to Polynesia. The apparent absence of the Bread-fruit (*Artocarpus incisa*, Forst.) in Arrou is noteworthy; inasmuch as Decaisne[1] records it from Timor. We assume it is not found in the Arrou Islands, because neither Wallace nor Moseley mentions it. Speaking of the food of the Aruese the former says:[2]— "The Aru men have no regular supply, no staff of life, such as bread, rice, mandioca, maize, or sago, which are the daily food of a large proportion of mankind. They have, however, many sorts of vegetables: yams, plantains, sweet potatoes, and raw sago; and they chew up vast quantities of sugar-cane, as well as betel-nuts, gambir, and tobacco."

Many more interesting details of the distribution of littoral plants might be adduced, but sufficient facts are embodied in these notes and in the observations under various species in the following enumeration to give a general idea of the vegetation of tropical sea-coasts, continental as well as insular. It is clear that the present general diffusion of a large proportion of the plants inhabiting the tidal forests and sandy and muddy sea-shores of the tropics is in a great measure due to oceanic currents. The wide colonisation of cultivated tropical plants is also easily accounted for, as well as that of the weeds commonly associated with them; but, eliminating the littoral, the naturalised cultivated plants, and their concomitant weeds from a flora, there remains an endemic element in the composition of the vegetation of many oceanic islands presenting problems difficult of solution, especially if their insularity has always been what it is now; but in the flora of the South-eastern Moluccas we have, so far as the present collections are concerned, no generic endemic element.

[1] Herbarii Timorensis Descriptio, p. 169. [2] Malay Archipelago, ii. p. 229.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

POLYPETALÆ.

RANUNCULACEÆ.

Clematis spp.

BABAR AND LARAT.—The genus is generally dispersed in temperate and tropical regions, though less common in the latter. There are two imperfect specimens of apparently different species.

Naravelia zeylanica, DC.

Naravelia zeylanica, DC.; Miq., Fl. Ind. Bat., i. 2, p. 2; Hook. f., Fl. Brit. Ind., i. p. 7.

TIMOR LAUT.—India; Himalayas and Eastern and Western Peninsulas; also in China and Java. The genus is confined to Tropical Asia.

ANONACEÆ.

Popowia filipes, n. sp.

Arbor vel *frutex*, ramulis graciliusculis junioribus ferrugineo-tomentosis. *Folia* brevissime petiolata, subcoriacea, glabra, oblonga, 2–4 poll. longa, apice rotundata vel obtuse acuminata, basi inæqualia, venis utrinque inconspicuis. *Flores* subsolitarii, gracillime pedunculati, $1\frac{1}{2}$–2 lineas longi, pedunculis 4–8 lineas longis. *Sepala* 3, brevissima, late triangularia, sparse puberula. *Petala* 6, inæqualia, 3 exteriora minuta, rotundata, obtuse acuminata, subpatentia, 3 interiora ovato-oblonga, valvatim conniventia, marginibus puberulis. *Stamina* circiter 12. *Ovaria* 6, glabra, fere sessilia, uniovulata, ovulo erecto. *Carpella* globosa, sicca vix 3 lineas diametro, brevissime stipitata.

ARROU. *Moseley.*

Popowia is a small genus widely dispersed in the tropics of the Old World.

MENISPERMACEÆ.

Anamirta cocculus, Wight. et Arnott.

Anamirta cocculus, Wight. et Arnott; Hook. f., Fl. Brit. Ind., i. p. 98; Miq., Fl. Ind. Bat., i. 2, p. 78.

KI; TIMOR LAUT; DAMMAR.—Eastern Bengal, Khasia Hills, and Assam, and from Concan and Orissa to Ceylon, as well as in the Malayan Islands.

Stephania rotunda, Lour?

Stephania rotunda, Lour? Hook. f., Fl. Brit. Ind., i. p. 103.

Timor Laut.—The true plant has a wide range in Continental Tropical Asia.

Cissampelos pareira, Linn.

Cissampelos pareira, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 85; Hook. f., Fl. Brit. Ind., i. p. 103; Muell., Syst. Census Austr. Pl., First Suppl., p. 3.

Arrou.—Common in nearly all tropical countries, including America; variable, and many of the forms regarded as species by some botanists. In Australia it is apparently uncommon, and has only recently been detected in the north-eastern part; and we have seen no specimens from Polynesia; but Darwin collected it in Charles and James Islands, Galapagos.

PAPAVERACEÆ.

Argemone mexicana, Linn.

Argemone mexicana, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 92; Hook. f., Fl. Brit. Ind., i. p. 117.

Arrou; Little Ki.—Herbaceous, and now common in almost all tropical and sub-tropical countries. Of American origin.

CRUCIFERÆ.

Brassica juncea, Hook. f. et Thoms.?

Brassica juncea, Hook. f. et Thoms.? in Hook. f., Fl. Brit. Ind., i. p. 157.

Arrou.—This species is common in Tropical Asia, where it is extensively cultivated for the oil obtained from its seeds.

CAPPARIDEÆ.

Polanisia viscosa, DC.

Polanisia viscosa, DC.; Benth., Fl. Austr., i. p. 90; Miq., Fl. Ind. Bat., i. 2, p. 97.

Timor Laut.—A very common annual or biennial weed in Tropical Asia, Africa, and Australia. Colonised in the West Indies and America; but there are no Polynesian specimens in the Kew Herbarium.

Gynandropsis pentaphylla, DC.

Gynandropsis pentaphylla, DC.; Miq., Fl. Ind. Bat., i. 2, p. 97; Hook. f., Fl. Brit. Ind., i. p. 171.

Arrou; Ki; Timor Laut; Letti.—Common in India and Africa, and also in America, where it is doubtfully indigenous. It is used as a pot-herb.

Cadaba sp., *Cadabæ capparoidi* aff., DC.

Letti.—*Cadaba capparoides*, DC., is a native of Australia and Timor, and the genus is spread over Tropical Asia and Africa. The specimen is insufficient for description.

Capparis sepiaria, Linn.

Capparis sepiaria, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 101; Hook. f., Fl. Brit. Ind., i. p. 177.

Timor Laut; Wetter.—Throughout India; from the Punjab and Sindh to Birma, Pegu, the Carnatic, and Ceylon. Also in Java, the Philippines, and Timor.

Capparis spinosa, Linn. var.

Capparis spinosa, Linn., var. (*Capparis mariana*, Jacq., Hort. Schœnbr., i. t. 109; Miq., Fl. Ind. Bat., i. 2, p. 100).

Letti.—Timor and the Marianne Islands.

There is little doubt that this is an unarmed form of *Capparis spinosa*, Linn., and hardly, if at all, different from the *Capparis rupestris*, Sibth. (Flora Græca, t. 487.) Indeed, in Hooker's Flora of British India, i. p. 173, it is, judging from the distribution given of that species, regarded as a form of it, as is also the *Capparis sandwichiana*, DC. Hooker and Arnott (Botany of Beechey's Voyage, 1841, p. 59) do not actually reduce either the last named or *Capparis mariana* to *Capparis spinosa*, but they say: "This appears scarcely different from *Capparis spinosa*; nor does the *Capparis mariana* seem to us deserving of the rank of a species." On the other hand, Gray, in Wilkes's United States Exploring Expedition, Botany, i. p. 69, treats *Capparis sandwichiana* as an independent species, stating that it "is distinguished from *Capparis spinosa*, which is sometimes unarmed, by its longer petioles, only one-third shorter than the blade, and its elongated club-shaped fruit, two and a half inches long by half an inch thick, raised on a stipe three inches long." But the admitted forms of *Capparis spinosa* differ much more from each other than some of them do from the Molucca and Pacific Island form. *Capparis sandwichiana* is figured in Gaudichaud's Voyage de la Bonite, t. 55, the letterpress of which was never published. *Capparis mariana* is figured in Blanco's Flora de Filipinas, illustrated edition, ii. (1878), p. 201, t. 179, and it is there stated that it was cultivated in the Philippines, having been originally brought from the Marianne Islands. The Herbarium specimens of *Capparis sandwichiana* and *Capparis mariana* are indistinguishable, and the figure of the fruit in Blanco agrees with Gray's description, being even a little more than two and a half inches long. But the characters by which Gray thought to distinguish *Capparis sandwichiana* from *Capparis spinosa* are found to be insufficient on comparing a numerous series of specimens; those relating to the fruit equally with those relating to the leaves. In the Sandwich Islands it appears to be common now in some parts, especially on the sea-shore, and Menzies first collected it on Vancouver's voyage in 1792; and the naturalists of Beechey's voyage collected it in one of the Society Islands in 1826. Jacquin described and figured *Capparis mariana* from a plant cultivated at Schœnbrunn in 1797, which he states was sent thither from the Mauritius, though a native of the Marianne Islands. This is confirmed in a measure by Bojer's Hortus Mauritianus. Allan

Cunningham collected it in 1818 in Timor, where he found it by roadsides and on walls. In Hooker's Flora of British India it is said to occur in Australia; but this is an error, which arose no doubt through Cunningham's plant being prominently labelled Australian Herbarium.

With regard to the origin of the insular plant, it seems highly probably that it was introduced by the Spaniards at an early date, for we have evidence that the buds and fruits are used in the same way as in Europe, and it consequently would be conveyed from island to island purposely and accidentally. In North-western India, Zanzibar, and Eastern Tropical Africa grows a variety of *Capparis spinosa*, namely, *Capparis galeata*, which has even larger flowers and fruit than the insular plant; so that altogether the affinities of this plant seem to be indisputable, though its Mediterranean origin cannot be proved.

Capparis sp., *Capparis lasiopodæ* et *pubifloræ* aff.

Timor Laut.—Specimen fragmentary and insufficient for determination, though it is clearly allied to the above named species from the same region. There are imperfect specimens of two or three other species of *Capparis* from Timor Laut, Dammar, and other islands, closely allied to, if not the same, as *Capparis lucida*, R. Br., and *Capparis salaccensis*, Bl. The former is a native of North Australia and Queensland, and the latter of Java.

VIOLARIEÆ.

Ionidium suffruticosum, Ging.

Ionidium suffruticosum, Ging.; Benth., Fl. Austr., i. p. 101; Miq., Fl. Ind. Bat., i. 2, p. 115 (*frutescens*).

Timor Laut.—Widely spread in Tropical Asia, Africa, and the eastern parts of Australia.

PITTOSPOREÆ.

Pittosporum revolutum, Ait. ?

Pittosporum revolutum, Ait.? Benth., Fl. Austr., i. p. 111.

Ki.—The typical plant inhabits Victoria, New South Wales, and Queensland. There is a specimen of a second species from Timor Laut. Altogether there are about fifty species of this genus, which is generally spread over the warmer parts of Asia, Africa, Australia, the Pacific Islands, and New Zealand.

POLYGALEÆ.

Polygala sp.

Ki.—Probably an undescribed species, but as there are many Archipelago species, of which we have seen no authentic specimens, we will not venture to give it a name. The genus is generally spread in tropical and most temperate countries, but it is wanting altogether in New Zealand, and only one species extends into temperate Australia.

PORTULACEÆ.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn.; Benth., Fl. Austr., i. p. 169.

Arrou; Timor Laut. Common, especially in maritime districts, in tropical and subtropical regions generally, including the most remote islands and islets, being apparently one of the first plants to establish itself on coral islands.

GUTTIFERÆ.

Garcinia sp.

Dammar.—The Guttiferæ are strongly represented in Tropical Asia, including the Archipelago; and the genus *Garcinia*, which comprises about sixty-five species, is almost confined to this area, a few species only occurring in Africa and Polynesia. *Garcinia timorensis* (Spanog. in Linnæa, xv. p. 178) we have not seen. There are no published species from Australia, but in the Kew Herbarium there are specimens of one species from Cape York Peninsula. With this exception, and one or two species of *Calophyllum*, no other members of the order are known to inhabit Australia.

Ochrocarpus ovalifolius, T. And.

Ochrocarpus ovalifolius, T. And., MSS. in Herb. Kew.
Calysaccion obovale, Miq., Fl. Ind. Bat. Suppl., i. pp. 194 et 500.

Timor Laut.—Originally described from specimens from Pulu Sangian, an island in the Sunda Straits. Mr Moseley collected it in Observatory Island, one of the Admiralty group. It is the tree alluded to in the Journal of the Linnean Society of London, xv. p. 75, under the name of *Calophyllum inophyllum*, as growing close to and overhanging the sea, the bases of many of the trunks being almost constantly washed by the waves. The genus comprises about six species, three or four of which are Asiatic, and the others inhabit Madagascar and Africa.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Benth., Fl. Austr., i. p. 183; Hook., Fl. Brit. Ind., i. p. 273; Miq., Fl. Ind. Bat., i. 2, p. 510; Seem., Fl. Vit., p. 12; Nadeaud, Enum. Pl. Tahiti, p. 69; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 101; Mann in Proc. Amer. Acad., vii. p. 156.

Arrou; Ki; Timor Laut; Larat.—An exceedingly common sea-shore tree in Polynesia, the Mascarene Islands, India, and the Indian Archipelago. Though growing chiefly in maritime districts, it succeeds perhaps almost equally well inland, and is cultivated throughout India.

DIPTEROCARPEÆ.

Vateria papuana, Dyer MSS. (Plate LXIV. B.)

Vatica papuana, Dyer in Journ. Bot., 1878, p. 100.

Arrou.—Also from Ramoi, Southern New Guinea, and in the New Guinea drift. For further particulars concerning this tree see above in the enumeration of the seeds and seed-vessels in the New Guinea drift.

MALVACEÆ.

Sida rhombifolia, Linn.

Sida rhombifolia, Linn.; Benth., Fl. Austr., i. p. 196; Miq., Fl. Ind. Bat., i. 2, p. 142; Hook. f., Fl. Brit. Ind., i. p. 323.

Timor Laut.—A generally diffused shrub or half-shrub, in warm countries of both hemispheres. It is variable, and several forms have been described as species.

Sida carpinifolia, Linn.

Sida carpinifolia, Linn.; Hook. f., Fl. Brit. Ind., i. p. 323; Miq., Fl. Ind. Bat. i. 2, p. 143 (*Sida stauntoniana*).

Arrou; Timor Laut.—A very widely diffused herb in warm countries, yet it is not known to inhabit Australia or Polynesia.

Sida humilis, Willd.

Sida humilis, Willd.; Hook. f., Fl. Brit. Ind., i. p. 322; Miq., Fl. Ind. Bat., i. 2, p. 139.

Timor Laut.—A widely spread weed in Tropical Asia, Africa, and America, but hitherto not found in Australia.

Abutilon indicum, Don.

Abutilon indicum, Don; Benth., Fl. Austr., i. p. 202; Miq., Fl. Ind. Bat., i. 2, p. 146; Hook. f., Fl. Brit. Ind., i. p. 326; Griseb., Fl. Brit. W. Ind., p. 78, *partim*.

Timor Laut; Letti.—Widely spread in Tropical Asia, Africa, and Australia, and

common, according to Miquel, in all the Molucca Islands. Bentham unites *Abutilon asiaticum*, Don, with this; but it is retained as a distinct species in the Flora of British India.

Abutilon graveolens, Wight et Arn.

Abutilon graveolens, Wight et Arn.; Hook. f., Fl. Brit. Ind., i. p. 327; Benth., Fl. Austr., i. p. 204; Miq., Fl. Ind. Bat., i. 2, p. 145 (*Abutilon hirtum*).

Timor Laut.—Tropical Asia, Africa, and Australia; and Grisebach, who treats this as a variety of *Abutilon indicum*, records it from the West Indies (Fl. Brit. W. Ind., p. 78).

Urena lobata, Linn.

Urena lobata, Linn.; Benth., Fl. Austr., i. p. 206; Miq., Fl. Ind. Bat., i. 2, p. 148; Hook. f., Fl. Brit. Ind., i. p. 329; Nadeaud, Enum. Pl. Tahiti, p. 67; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 99; Seem., Fl. Vit., p. 16.

Timor Laut.—A common herb in all tropical regions, exhibiting great variability in nearly all parts of its range.

Hibiscus rosa-sinensis, Linn.

Hibiscus rosa-sinensis, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 156; Hook. f., Fl. Brit. Ind., i. p. 344; Nadeaud, Enum. Pl. Tahiti, p. 67; Seem., Fl. Vit., p. 16; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 94.

Ki.—Cultivated in Java and Timor, and throughout India, according to Hooker. It is found in many of the Pacific Islands, as well as China and Cochin-China, where it may be indigenous.

Hibiscus surattensis, Linn.

Hibiscus surattensis, Linn.; Hook. f., Fl. Brit. Ind., i. p. 334; Miq., Fl. Ind. Bat., i. 2, p. 161; Oliver, Fl. Trop. Afr., i. p. 201.

Timor Laut.—Timor, through the Archipelago to the Philippine Islands, and Penang to Bengal, and common in Tropical and South Africa. Though recorded from Australia, both in the Flora of Tropical Africa and the Flora of British India, we have seen no specimens, and suspect it to be an error.

Hibiscus tetraphyllus, Roxb.

Hibiscus tetraphyllus, Roxb.; Hook. f., Fl. Brit. Ind., i. p. 341.

Timor Laut.—This annual herb has a wide range in India; but we have seen no other specimens from the Archipelago.

Hibiscus vitifolius, Linn.

Hibiscus vitifolius, Linn.; Benth., Fl. Austr., i. p. 215; Hook. f., Fl. Brit. Ind., i. p. 338; Miq., Fl. Ind. Bat., i. 2, p. 160.

Moa.—Widely dispersed in the tropics of the Old World, and naturalised in the West Indies. It is a herbaceous species readily distinguished by its winged capsules.

Hibiscus virgatus, Blume.

Hibiscus virgatus, Blume; Miq., Fl. Ind. Bat., i. 2, p. 156.

Timor Laut.—Also from Timor and Java.

Hibiscus tiliaceus, Linn.

Hibiscus tiliaceus, Linn.; Benth., Fl. Austr., i. p. 218; Miq., Fl. Ind. Bat., i. 2, p. 153; Hook. f., Fl. Brit. Ind., i. p. 343; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 94; Seem., Fl. Vit., p. 18.

Paritium tiliaceum, Adr. Juss. in St. Hilaire Fl. Bras. Merid., i. p. 256.

Letti; Babar.—One of the most generally dispersed sea-coast trees in the tropics and some subtropical countries, and particularly abundant in Polynesia and other Pacific Islands, including the Sandwich and Galapagos, often growing within reach of the ordinary tides. It is one of the score or so of flowering plants collected in the Keeling Islands by the late Charles Darwin. Among other localities we have seen specimens from Pitcairn Island. Though naturally a maritime tree, it ascends the rivers to considerable distances, and is often planted inland on account of its ornamental aspect.

Thespesia populnea, Corr.

Thespesia populnea, Corr.; Benth., Fl. Austr., i. p. 221; Hook. f., Fl. Brit. Ind., i. p. 345; Miq., Fl. Ind. Bat., i. 2, p. 150; Seem., Fl. Vit., p. 18; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 96 (*Hibiscus*).

Arrou; Dammar; Timor Laut.—A common sea-shore tree in the tropics of the Old World, and especially abundant in Polynesia. Forster, on Cook's second voyage, collected it in Easter Island. It is naturalised in the West Indies. Seemann, in Kittlitz's Views of the Vegetation of the Pacific (English edition), p. 22, enumerates the following as some of the principal trees immediately succeeding the mangroves:—*Barringtonia speciosa*, *Calophyllum inophyllum*, *Hibiscus tiliaceus*, and *Thespesia populnea*. Jouan mentions that *Thespesia populnea* is somewhat rare in the Marquesas, and only met with on the sea-shore where the waves could have conveyed the seeds. This tree does not occur in the Sandwich Islands.

Thespesia lampas, Dalz. et Gibs.

Thespesia lampas, Dalz. et Gibs.; Hook. f., Fl. Brit. Ind., i. p. 345; Oliver, Fl. Trop. Afr., i. p. 209.

Thespesia macrophylla, Blume; Miq., Fl. Ind. Bat., i. 2, p. 151?

Timor Laut.—Common in India, and apparently throughout the Archipelago, but not

known to inhabit Australia or Polynesia; and the African specimens referred to this species are doubtful.

Gossypium barbadense, Linn.

Gossypium barbadense, Linn.; Hook. f., Fl. Brit. Ind., i. p. 347; Oliver, Fl. Trop. Afr., i. p. 210; Seem., Fl. Vit., p. 21.
Gossypium vitifolium, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 163.

Timor Laut.—Generally diffused in hot countries as an escape from or the remains of cultivation. The varieties of this species furnish the so-called American cotton.

Gossypium herbaceum, Linn.

Gossypium herbaceum, Linn.; Hook. f., Fl. Brit. Ind., i. p. 346; Oliver, Fl. Trop. Afr., i. p. 211; Miq., Fl. Ind. Bat., i. 2, p. 162 (*Gossypium indicum* et *Gossypium micranthum*).

Timor Laut.—Now widely diffused in warm countries. *Gossypium stocksii*, Masters in Hook. f. Fl. Brit. Ind., i. p. 346, is probably the wild parent of the forms usually referred to this species.

Bombax insigne, Wall. ?

Bombax insigne, Wall., Pl. Asiat. Rar., p. 71, tt. 79, 80? Hook. f., Fl. Brit. Ind., i. p. 349.

Timor Laut.—It is uncertain whether the Timor Laut specimen belongs to the present species, or to the commoner Indian *Bombax malabaricum*, which has also been found in North Australia. There is one different species in Tropical Africa, and several in America. Miquel does not include the genus, and there are no other Archipelago specimens in the Kew Herbarium.

STERCULIACEÆ.

Sterculia fœtida, Linn.

Sterculia fœtida, Linn.; Benth., Fl. Austr., i. p. 226; Hook. f., Fl. Brit. Ind., i. p. 354; Miq., Fl. Ind. Bat., i. 2, p. 172.

Lakor; Timor Laut.—Tropical Australia; throughout the Indian Archipelago, India, including the Western Peninsula, and Eastern Tropical Africa. A large tree common in the Moluccas. Two other species of *Sterculia* were collected in Timor Laut and Ki Island; one of them is apparently *Sterculia balanghas*, a common Indian species. The genus is a large one, and spread over all tropical countries, but most numerous in species in Asia, where it extends into temperate regions in China and Japan. *Sterculia vitiensis*, Seem. (Fl. Vit., p. 23), is very closely allied to *Sterculia fœtida*.

Heritiera littoralis, Dryander.

Heritiera littoralis, Dryander; Miq., Fl. Ind. Bat., i. 2, p. 179; Hook. f., Fl. Brit. Ind., i. p. 363 (excl. syn. *Heritiera macrophylla*); Benth., Fl. Austr., i. p. 231; Oliver, Fl. Trop. Afr., i. p. 225; Seem., Fl. Vit., p. 23.

Arrou.—A seaside tree throughout Tropical Asia; in Northern Australia, the Fiji and Tongan Islands, and Eastern Tropical Africa. The large carpels float, and Mr Moseley picked up some on the beach at Arrou, but no specimens of the foliage or flowers.

Kleinhovia hospita, Linn.

Kleinhovia hospita, Linn.; Hook. f., Fl. Brit. Ind., i. p. 364; Miq., Fl. Ind. Bat., i. 2, p. 186; Oliver, Fl. Trop. Afr., i. p. 226; Seem., Fl. Vit., p. 24.

Timor Laut; Babar; Wetter.—Common in the Archipelago and India, as well as in the Fiji and Society Islands; also occurring in the Mascarene Islands and the islands of Eastern Tropical Africa, but not known to grow in Australia nor on the mainland of Africa. Naturalised in the West Indies. A handsome tree, generally growing gregariously, according to Seemann.

Helicteres isora, Linn.

Helicteres isora, Linn.; Benth., Fl. Austr., i. p. 232; Miq., Fl. Ind. Bat., i. 2, p. 169; Hook. f., Fl. Brit. Ind., i. p. 365.

Letti.—Throughout the Archipelago and India, common; but only found in the extreme north of Australia, and not recorded from Polynesia. A considerable genus widely spread in the tropics, and most numerously represented in America, but apparently absent from Africa.

Melhania n. sp. ?

Timor Laut.—This species is allied to the Indian *Melhania tomentosa*. The genus consists of about twenty species in Tropical Asia and Africa, one of the Asiatic species occurring in Australia; and there are two very distinct species in St Helena, which are sometimes referred to *Trochetia*, which they more closely resemble in habit.

Melochia velutina, Bedd.

Melochia velutina, Bedd.; Hook. f., Fl. Brit. Ind., i. p. 374.
Riedleia tiliæfolia, DC., Prodr., i. p. 490; Miq., Fl. Ind. Bat., i. 2, p. 188.

Ki; Letti; Timor Laut.—Timor and northward into the hotter parts of India, though often only planted. *Melochia* numbers upwards of fifty species, spread nearly all over the warmer regions of both hemispheres.

Melochia odorata, Forst.

Melochia odorata, Forst., Fl. Ins. Austr. Prodr., p. 47.
Riedleia odorata, DC., Prodr., i. p. 491.
Melochia vitiensis, A. Gr.; Seem., Fl. Vit., p. 24?

Dammar; Timor Laut.—New Caledonia; New Hebrides; Fiji Islands; Samoa.

TILIACEÆ.

Brownlowia riedelii, n. sp.

Brownlowiæ elatæ affinis, differt foliis cordata-ovatis crassioribus, subtus minute lepidotis, supra nitidis, basi 5-nervosis, petiolis longioribus, floribus duplo minoribus.

Wetter.—This species is readily distinguished from its nearest ally by the characters given. *Brownlowia elata* has rotundate leaves, seven-nerved at the base, clothed with very short pale brown hairs beneath, and the upper surface much less polished; and the flowers, with a whitish calyx, are at least double the size of this species. In floral structure there is no essential difference. The fruit of *Brownlowia riedelii* is unknown. Altogether four species are described, and the genus is restricted to India and the Archipelago.

In the Flora of British India, *Brownlowia peltata*, Benth. (Journ. Linn. Soc. Lond. v. Suppl., p. 56), is confounded by Masters with *Brownlowia elata*. The former was originally described from Bornean specimens, but it is also found in Mergui and other parts of the Malayan Peninsula. It is easily recognised by its peltate leaves on very long petioles.

Triumfetta rhomboidea, Jacq.

Triumfetta rhomboidea, Jacq.; Hook. f., Fl. Brit. Ind., i. p. 395; Oliver, Fl. Trop. Afr., i. p. 257; Miq., Fl. Ind. Bat., i. 2, p. 197 (*Triumfetta angulata*, Lam.)

Timor Laut.—Common in Tropical Asia, and generally dispersed in Tropical Africa; also occurring in Tropical America. The seed-vessel of this species is covered with hooked prickles. It is very variable in its foliage, the same variations being repeated in different parts of its area.

Triumfetta annua, Linn.

Triumfetta annua, Linn.; Hook. f., Fl. Brit. Ind., i. p. 396; Miq., Fl. Ind. Bat., i. 2, p. 196.

Timor Laut.—Throughout Tropical Asia and Africa. This also has the seed-vessel furnished with hooked prickles. A third, undetermined, species of this genus was collected in Timor Laut. *Triumfetta procumbens*, Forst., is a seaside species common in Polynesia, and in some islands of the Malayan Archipelago and Indian Ocean, also occurring on maritime sands in North-eastern Australia. In the Kew Herbarium there are specimens from Diego Garcia, Chagos Islands, Indian Ocean, and from several remote islands of Polynesia, such as Fanning, Suwarrow, and Enderbury.

Corchorus olitorius, Linn.

Corchorus olitorius, Linn.; Hook. f., Fl. Brit. Ind., i. p. 397; Miq., Fl. Ind. Bat., i. 2, p. 195; Benth., Fl. Austr., i. p. 276; Oliver, Fl. Trop. Afr., i. p. 262.

Timor Laut.—Often cultivated as a pot-herb, as well as for the fibres of its stem, and found in a wild state throughout the tropics.

Corchorus acutangulus, Lam.

Corchorus acutangulus, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 194; Benth., Fl. Austr., i. p. 277; Hook. f., Fl. Brit. Ind., i. p. 398.

Timor Laut.—Generally dispersed in the tropics of the Old World, and occurring in some parts of South America, where, however, it may have been introduced.

Corchorus trilocularis, Linn.

Corchorus trilocularis, Linn.; Hook. f., Fl. Brit. Ind., i. p. 397; Oliver, Fl. Trop. Afr., i. p. 262; Muell., Syst. Census Austr. Pl., p. 17.

Timor Laut.—Common in Tropical Asia and Africa, but only recorded from Queensland in Australia.

MALPIGHIACEÆ.

Ryssopterys timorensis, Blume.

Ryssopterys timorensis, Blume; Miq., Fl. Ind. Bat., i. 2, p. 584; Benth., Fl. Austr., i. p. 285.

Wetter.—Northern Australia, New Caledonia, and New Guinea to the Philippines and Java. Seed-vessel winged like that of the Sycamore. There are several other species in the Indian Archipelago.

Tristellateia australasica, A. Rich.

Tristellateia australasica, A. Rich; Benth., Fl. Austr., i. p. 286; Hook. f., Fl. Brit. Ind., i. p. 418; Miq., Fl. Ind. Bat., i. 2, p. 585.

Arrou; Ki; Timor Laut.—North Australia, through New Guinea and the Archipelago to Singapore. Fruit winged.

ZYGOPHYLLEÆ.

Tribulus cistoides, Linn.

Tribulus cistoides, Linn.; Benth., Fl. Austr., i. p. 288; Hook. f., Fl. Brit. Ind., i. p. 423; H. Mann in Proc. Amer. Acad., vii. p. 158.

Ki; Timor Laut.—Common in Tropical Australia, Sandwich Islands, and many parts of America; rarer in Tropical Asia and Africa. Seemann does not mention it in his Flora Vitiensis, and it does not appear to reach any of the South Pacific Islands. Seed-vessel furnished with spines.

GERANIACEÆ.

Averrhoa carambola, Linn.

Averrhoa carambola, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 133; Hook. f., Fl. Brit. Ind., i. p. 439.

Timor Laut.—Common throughout the Archipelago, and in India; but it is extensively cultivated, and believed to have been originally introduced from America.

Impatiens sp.

Ki.—The genus *Impatiens*, so numerous in India, is represented by few species in the Archipelago, and not at all in Australia. One species occurs in Timor. The specimen is insufficient for determining the species.

RUTACEÆ.

Glycosmis pentaphylla, Corr., var.

Glycosmis pentaphylla, Corr., var.; Hook. f., Fl. Brit. Ind., i. p. 499; Miq., Fl. Ind. Bat. i. 2, p. 522; Benth., Fl. Austr., i. p. 367.

Arrou; Ki; Timor Laut; Babar.—An exceedingly variable shrub or tree, generally spread in Tropical Asia, and occurring in Northern Australia. Fruit a small berry.

Micromelum pubescens, Blume.

Micromelum pubescens, Blume; Benth., Fl. Austr., i. p. 368; Hook. f., Fl. Brit. Ind., i. p. 501; Oliv. in Journ. Linn. Soc. Lond. v. Suppl., p. 40.
Micromelum minutum, Seem., Fl. Vit., p. 31.

Ki; Timor Laut; Dammar.—Common in Tropical Australia and Eastern Polynesia, and through the Archipelago to India and China. Seemann states that he thinks the Australian and Polynesian plant is a distinct species. It is found in North-eastern Australia, New Caledonia, and the Friendly and Fiji Islands. The genus comprises two other species which inhabit the Archipelago.

Murraya exotica, Linn. var.

Murraya exotica, Linn. var.; Benth., Fl. Austr., i. p. 369; Miq., Fl. Ind. Bat., i. 2, p. 522; Hook. f., Fl. Brit. Ind., i. p. 502.

Timor Laut; Babar.—North Australia and New Hebrides, to India, from Bengal to the north-west. Commonly cultivated for its sweet-scented flowers. There are several varieties. *Murraya* is a small genus restricted to the area of the present species.

Atalantia nitida, Oliv. var.

Atalantia nitida, Oliv. var.; Journ. Linn. Soc. Lond. v. Suppl., p. 25.

Timor Laut.—The typical form inhabits the Philippines. The genus consists of about ten Asiatic and one Australian species.

Citrus, sp.

Ki.—The cultivated and wild species and varieties are numerous in the Archipelago, and two occur in Tropical Australia.

SIMARUBEÆ.

Suriana maritima, Linn.

Suriana maritima, Linn.; Benth., Fl. Austr., i. p. 375; Miq., Fl. Ind. Bat., i. 2, p. 619; Hook. f., Fl. Brit. Ind., i. p. 522; Seem., Fl. Vit., p. 34; Nadeaud, Enum. Pl. Tahiti, p. 75.

Timor Laut.—A monotype and one of the most widely diffused of seaside shrubs, being found on nearly all tropical shores, insular and continental, where there is vegetation. In the Atlantic it is found as far north as the Bermudas. It is apparently somewhat rare in the Pacific, for Seemann did not meet with it in the Fijis, and it is not included in Mann's list of Sandwich Island plants. Nadeaud states that it is no longer met with in Tahiti, where it formerly existed, though in some of the adjacent islets it is still abundant. Nevertheless, he designates it a representative of the madreporic vegetation. The only Polynesian specimens in the Kew Herbarium are from the Friendly Islands (Menzies), Tahiti (Hinds), Bow Island, Dangerous Archipelago (Barclay), and Funafuti, Ellice group (Whitmee). The last named collector, who visited many islands of the Samoan, Phœnix, Ellice, and Gilbert groups, records on his label that Funafuti was the only island on which he met with it.

Harrisonia brownii, Juss.

Harrisonia brownii, Juss.; Benth., Fl. Austr., i. p. 376; Miq., Fl. Ind. Bat., i. 2, p. 677.

Lakor; Timor Laut.—Northern Australia, Timor, and the Philippines, and probably in some of the intervening islands.

MELIACEÆ.

Dysoxylon, n. sp. ?

Arrou; Timor Laut.—There are imperfect specimens of three species, apparently belonging to this genus, which ranges all over Tropical Asia, extending southward to New Zealand.

Aglaia elæagnoides, Benth.

Aglaia elæagnoides, Benth., Fl. Austr., i. p. 383.

Ki; Timor Laut.—North Australia, New Caledonia, New Hebrides, New Guinea, and the Celebes. *Aglaia* is a small genus spread over the Archipelago, and extending to Polynesia and Australia.

Owenia cerasifera, F. Muell. ?

Owenia cerasifera, F. Muell. ? Benth., Fl. Austr., i. p. 386.

Timor Laut.—There is some doubt whether the insular specimens belong to this species, which is not well defined. Previously the genus was only known from Tropical and Subtropical Australia, where there are about half a dozen species.

Carapa moluccensis, Lam.

Carapa moluccensis, Lam.; Benth., Fl. Austr., i. p. 387; Hook. f., Fl. Brit. Ind., i. p. 567; Oliver, Fl. Trop. Afr., i. p. 337; Seem., Fl. Vit., p. 38.
Xylocarpus granatum, Kœnig.; Miq., Fl. Ind. Bat., i. 2, p. 546.

Timor Laut.—A tree or large shrub found on most muddy sea-shores from Northern Australia through the Archipelago to India and Ceylon; also in Madagascar and on the east coast of Tropical Africa. It extends eastward as far as the Fiji Islands. The seeds of this tree are large and very light, having a thick spongy or fibrous testa. Mr Moseley's collection of drift seeds includes this. *Carapa guianensis* inhabits the West Indies, Guiana, and Senegambia, and there are two or three other Asiatic species.

OLACINEÆ.

Cardiopteris lobata, R. Br.

Cardiopteris lobata, R. Br.; Hook. f., Fl. Brit. Ind., i. p. 597; Miq., Fl. Ind. Bat., i. 1, p. 798.

Timor Laut.—The only species, ranging from New Guinea and Ceram to Western China and Eastern India. In Java the leaves are eaten as a vegetable. The indehiscent seed-vessel is light and broadly winged. Besides this, which is of anomalous structure, two or three other members of this Order were collected in the South-eastern Moluccas. Thus a species of *Gomphandra?* in Arrou, and a *Strombosia?* in Timor Laut; both very imperfect specimens.

Ximenia americana, Linn.

Ximenia americana, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 786; Benth., Fl. Austr., i. p. 391; Hook. f., Fl. Brit. Ind., i. p. 574.
Ximenia elliptica, Forst.; Seem.,-Fl. Vit., p. 39; Nadeaud, Enum. Pl. Tahiti, p. 70.

Timor Laut.—Maritime districts throughout the tropics of both hemispheres. The fruit is eaten. Seemann states that the Pacific Island plant is always unarmed, and he retains it as an independent species. Nadeaud relates that this shrub is pseudo-parasitical, and that it had become very rare in Tahiti itself, although still abundant in some of the neighbouring islets. He classes it with the true madreporic plants. The few other species of *Ximenia* are American or African.

CELASTRINEÆ.

Euonymus javanicus, Blume.

Euonymus javanicus, Blume; Horsf., Pl. Jav., p. 13, t. 28; Miq., Fl. Ind. Bat., i. 2, p. 588, *β timorensis*, Zipp.

ARROU.—Also in Timor; the typical form is common in Java.

Gymnosporia montana, Benth. ?

Gymnosporia montana, Benth.? Fl. Austr., i. p. 400, Hook. f., Fl. Brit. Ind., i. p. 621; Oliver, Fl. Trop. Afr., i. p. 361 (*Celastrus senegalensis*, Lam.)

TIMOR LAUT.—A very variable species, ranging from Australia to North-western India, and also widely dispersed in Tropical Africa. *Gymnosporia* is widely spread in the warmer regions of the Old World, extending to the Pacific Islands and South-western Europe.

Hippocratea grahami, Wight?

Hippocratea grahami, Wight? Hook. f., Fl. Brit. Ind., i. p. 624.

TIMOR LAUT.—The species is doubtful. *Hippocratea* is a large genus, generally spread in the tropics. There is also a doubtful species of the allied genus *Salacia*, perhaps *Salacia patens*, Dene., from Timor Laut. *Hippocratea grahami* inhabits the Indian Peninsula from Concan southward, and perhaps also Assam and Silhet.

RHAMNEÆ.

Smythea pacifica, Seem.

Smythea pacifica, Seem., Fl. Vit., p. 41, t. 11.

ARROU.—Fiji and Admiralty Islands, and perhaps also New Guinea and Timor Laut, for *Smythea novoguineensis*, Scheff., does not appear to be different. The genus was founded on this species, and two others are known to inhabit the Malayan Peninsula.

Alphitonia excelsa, Reiss. var.

Alphitonia excelsa, Reiss. var.; Benth., Fl. Austr., i. p. 414; Seem., Fl. Vit., p. 43.

TIMOR LAUT.—Tropical Australia, and common throughout the Fiji Islands; also collected in the Society, Tongan, and Samoan Islands, and in New Caledonia. Perhaps also in Borneo and the Philippines; or, if not the same species, a very closely allied one. As limited by Bentham and Seemann, the species is a very variable one, and several of the forms have been described as species. Mr Bentham suggests that there is only one species. It is a tree of considerable size; yielding a useful timber.

Gouania microcarpa, DC.

Gouania microcarpa, DC.; Miq., Fl. Ind. Bat., i. 1, p. 650; Hook. f., Fl. Brit. Ind., i. p. 643; Seem., Fl. Vit., p. 43.

Timor Laut.—Java, Malacca, and the Western Peninsula of India. *Gouania richii*, A. Gr., of the Fiji Islands, is very near this. The genus is generally diffused in the tropics, except Australia.

AMPELIDEÆ.

Vitis repens, Wight and Arnott.

Vitis repens, Wight and Arnott; Hook. f., Fl. Brit. Ind., i. p. 646.
Cissus repens, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 605.

Timor Laut.—Amboina and Java, and almost all over India. According to Miquel, the leaves are employed as an acidulant.

Vitis tenuifolia, Wight and Arnott?

Vitis tenuifolia, Wight and Arnott? Hook. f., Fl. Brit. Ind., i. p. 660.

Timor Laut.—Nearly all over India, and also in China and Japan. Fragments of several other species of *Vitis* were collected in Arrou, Maru, Timor Laut, &c.

Leea sambucina, Willd. var.?

Leea sambucina, Willd. var.? Benth., Fl. Austr., i. p. 451; Miq., Fl. Ind. Bat., i. 2, p. 611; Hook. f., Fl. Brit. Ind., i. p. 666; Seem., Fl. Vit., p. 44.

Arrou; Dammar.—This handsome shrub is generally diffused in Tropical Asia, Africa, Australia, and the Fiji Islands. Fruit a berry, as in *Vitis*. *Leea* is peculiar to the Old World.

Leea æquata, Linn.

Leea æquata, Linn., Mant., p. 124; C. B. Clarke in Journ. Bot., 1881, p. 163.

Arrou; Ki; Babar; Dammar; Timor Laut.—A very common species in Eastern Tropical India and Malaya.

SAPINDACEÆ.

Erioglossum edule, Blume.

Erioglossum edule, Blume; Miq., Fl. Ind. Bat., i. 2, p. 574; Benth., Fl. Austr., i. p. 454; Hook. f., Fl. Brit. Ind., i. p. 672.

Timor Laut.—Northern Australia, and generally spread in Tropical Asia. Miquel states that the fruit of this large tree is eaten in the Archipelago. *Erioglossum* is a small genus limited to the tropics of the Old World.

Allophylus cobbe, Blume, var.

Allophylus cobbe, Blume, var.; Hook. f., Fl. Brit. Ind., i. p. 673.
Allophylus timorensis, sundanus, &c., Miq., Fl. Ind. Bat., i. 2, p. 575.
Schmidelia serrata, DC.; Benth., Fl. Austr., i. p. 455.
Schmidelia cobbe, DC., Prodr., i. p. 610.

Arrou; Ki; Timor Laut.—This tree is spread all over Tropical Asia, and has also been found in Northern Australia. It is exceedingly variable, and upwards of a score of the forms have been proposed as species under the generic names of *Ornitrophe, Schmidelia, Allophylus*, &c., so that its synonymy is very copious.

Schmidelia sp.

Arrou.—This is probably one of the described species, but they are very difficult to determine from incomplete specimens. Genus spread all over the tropics, with the greatest concentration of species in America.

Cupania spp.

Ki; Timor Laut.—There are indifferent specimens of three or four species of this generally dispersed genus of tropical trees and shrubs.

Atalaya sp. ?

Timor Laut.—With the exception of one from Timor, all the described species of this genus are endemic in Tropical and Subtropical Australia.

Schleichera trijuga, Willd.

Schleichera trijuga, Willd.; Hook. f., Fl. Brit. Ind., i. p. 681; Miq., Fl. Ind. Bat., i. 2, p. 573.

Letti; Wetter; Timor Laut.—A large tree spread all over Tropical Asia, and commonly planted in the lower region in the Archipelago, according to Miquel, for its juicy, fleshy fruit.

Dodonæa viscosa, Linn.

Dodonæa viscosa, Linn.; Benth., Fl. Austr., i. p. 475; Hook. f., Fl. Brit. Ind., i. p. 697; Seem., Fl. Vit., p. 49.
Dodonæa angustifolia, Linn. f., Suppl. Pl., p. 218; Miq., Fl. Ind. Bat., i. 2, p. 580.

Lakor; Larat; Moa; Timor Laut.—This species grows almost everywhere in tropical and subtropical regions, and also extends into temperate countries, both north and south. It is very variable, and the extreme forms are very different, but they are connected by every possible intermediate gradation. Mr Bentham (*loc. cit.*) says:—"It includes probably the whole of the extra-Australian described species, except, perhaps, the *Dodonæa*

criocarpa from the Sandwich Islands, *Dodonæa thunbergiana* from South Africa, and one or two Mexican ones, which, whether varieties or species, do not occur in Australia. Whatever the rank of these forms, they all belong to the same type, which is also abundantly represented in Australia, where there are upwards of forty other species, exhibiting a great diversity in their foliage, flowers, and fruits, though many of them are difficult of discrimination. One large section has pinnate leaves, while in others they are long and slender like those of a pine, or short and slender like those of a heath.

Dodonæa viscosa is one of those plants that thrive on the sea-coast as well as inland, and in almost any soil or situation.

ANACARDIACEÆ.

Mangifera spp.

Letti; Timor Laut.—Specimens of two or three species of this essentially Malayan genus were collected, but they have not been identified. *Mangifera indica*, the Mango, a native of Tropical India, is commonly cultivated there as well as in other hot countries.

Buchanania angustifolia, Roxb. var. ?

Buchanania angustifolia, Roxb. var. ? Hook. f., Fl. Brit. Ind., ii. p. 23; Benth., Fl. Austr., i. p. 490.

Arrou.—As limited by Mr Bentham, *Buchanania angustifolia* would perhaps include this plant; but Sir Joseph Hooker states that the Malayan and Australian forms present some essential differences.

Buchanania arborescens, Blume ?

Buchanania arborescens, Blume ? Miq., Fl. Ind. Bat., i. 2, p. 636.

Babar.—The typical form is restricted to the Archipelago, and the present one may be specifically different. There is a third undetermined species collected in Arrou by Mr Moseley. The genus is almost exclusively restricted to Tropical Asia, one species only being known from Australia, and one or two from the Fiji Islands.

Semecarpus heterophyllus, Blume.

Semecarpus heterophyllus, Blume; Miq., Fl. Ind. Bat., i. 2, p. 625.

Timor Laut.—This may be different from the Java and Sumatra *Semecarpus heterophyllus*, the use of the fruit of which is said to cause swelling and eruptions. The genus is restricted to Tropical Asia, except the common *Semecarpus anacardium*, which extends to North Australia.

MORINGEÆ.

Moringa pterygosperma, Gærtn.

Moringa pterygosperma, Gærtn.; Hook. f., Fl. Brit. Ind., ii. p. 45.

Timor Laut.—A native of Tropical Asia, commonly cultivated there and in other tropical countries for the oil afforded by its winged seeds. There are only two other species, and the genus is confined to the Old World.

LEGUMINOSÆ.

Papilionaceæ.

Crotalaria linifolia, Linn. f.

Crotalaria linifolia, Linn. f.; Benth., Fl. Austr., ii. p. 180; Miq., Fl. Ind. Bat., i. 1, p. 342; Hook. f., Fl. Brit. Ind., ii. p. 72.

Timor Laut.—A very common species throughout Tropical Asia and Australia, growing equally well on the coast and inland. It is singular that this genus, which numbers between two and three hundred species, generally spread in tropical and subtropical regions, is almost entirely absent from the Pacific Islands. Seemann (Flora Vitiensis, p. 54) enumerates one, *Crotalaria quinquefolia*, Linn., which is also found in Tana, and is widely spread in Tropical Asia, and also occurs in Tropical Australia. Horace Mann (Proc. Amer. Acad. Sci., xii. p. 163) includes three species in his Catalogue of Hawaiian Plants; two of which are treated as of recent introduction, while the third, *Crotalaria sericea*, Retz., he suspected to have been introduced by the aborigines. Jouan, in his sketch of the vegetation of some of the Pacific Islands (Mém. Soc. Sci. Nat. Cherbourg, 1865), does not mention a single species, nor does Nadeaud in his Énumération des Plantes Indigènes de l'Ile de Tahiti, 1873.

Crotalaria sericea, Retz.

Crotalaria sericea, Retz.; Miq., Fl. Ind. Bat., i. 1, p. 330; Hook. f., Fl. Brit. Ind., ii. p. 75.

Timor Laut.—Common throughout Tropical India, including the Archipelago, where, as well as in other countries, it is often cultivated on account of its ornamental character. It occurs in the Sandwich Islands, where, however, as stated under *Crotalaria linifolia*, it is regarded as an introduced plant.

Indigofera anil, Linn.

Indigofera anil, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 307; Seem., Fl. Vit., p. 54; Oliver, Fl. Trop. Afr., ii. p. 98; Griseb., Fl. Brit. W. Ind., p. 181.

Timor Laut.—This is one of the species most commonly cultivated for indigo dye,

and its native country is uncertain, or at least disputed. Bentham (DC., Prodr., ii. p. 225) treats it as an American plant, which has run wild from cultivation in the Old World. It is not mentioned in Hooker's Flora of British India; but Miquel is of opinion that it is indigenous there, as well as *Indigofera tinctoria*, a closely allied species. *Indigofera anil* is common, and apparently generally spread in a wild state in Tropical Africa. The genus numbers upwards of two hundred species, spread all over the tropics, and extending into some extratropical regions; the greatest concentration of species is in Tropical and South Africa.

Indigofera linifolia, Retz.

Indigofera linifolia, Retz.; Miq., Fl. Ind. Bat., i. 1, p. 315; Benth., Fl. Austr., ii. p. 195; Hook. f., Fl. Brit. Ind., ii. p. 92.

Larat; Timor Laut.—Common throughout Tropical Asia; occurring also in Northern Australia and in Eastern Tropical Africa.

Tephrosia purpurea, Pers.

Tephrosia purpurea, Pers.; Miq., Fl. Ind. Bat., i. 1, p. 296; Benth., Fl. Austr., ii. p. 209; Hook. f., Fl. Brit. Ind., ii. p. 112; Oliver, Fl. Trop. Afr., ii. p. 124.

Tephrosia piscatoria, Pers.; Seem., Fl. Vit., p. 55; A. Gray, Wilkes' U.S. Expl. Exped. Bot., i. p. 408 (*Tephrosia baueri*, Benth.)

Timor Laut.—This shrub grows almost everywhere in the tropics, both in the Old World and America, extending in some countries into subtropical regions. It is a common seaside plant in the Archipelago, and in many of the Pacific Islands, including the Fiji, Society, and Sandwich Islands; but H. Mann (in Proc. Amer. Acad., vii. p. 163) places it in the category of plants most likely introduced into the Sandwich Islands by the aborigines. Nadeaud (Enum. Pl. Tahiti, p. 79) describes it as a plant of the first hills at 1000 to 1200 feet elevation, bearing the native name "Hora." *Tephrosia* numbers about one hundred species, spread over all the warmer regions of the earth.

Sesbania grandiflora, Pers.

Sesbania grandiflora, Pers.; Benth., Fl. Austr., ii. p. 212; Hook. f., Fl. Brit. Ind., ii. p. 115; H. Mann in Proc. Amer. Acad., vii. p. 163.

Agati grandiflora, Desv.; Miq., Fl. Ind. Bat., i. 1, p. 289.

Timor Laut.—North Australia, and common throughout the Indian Archipelago, and often cultivated. It also occurs wild in India and the Mauritius, where it is doubtfully indigenous; and it is in the early collections from the Sandwich Islands; but Mann treats it as a plant introduced into the island by the aborigines. The genus, although counting less than a score of species, is spread all over the tropics.

Sesbania aculeata, Pers.

Sesbania aculeata, Pers.; Miq., Fl. Ind. Bat., i. 1, p. 287; Benth., Fl. Austr., ii. p. 212; Hook. f., Fl. Brit. Ind., ii. p. 114.

Letti.—Everywhere in the tropics of the Old World; also occurring in the West Indies and Tropical America, where it is most likely a colonist.

Desmodium gangeticum, DC.

Desmodium gangeticum, DC.; Miq., Fl. Ind. Bat., i. 1, p. 247; Benth., Fl. Austr., ii. p. 232; Hook. f., Fl. Brit. Ind., ii. p. 168; Oliver, Fl. Trop. Afr., ii. p. 161.

Arrou; Ki.—Widely diffused in the tropics of the Old World, and very common in many parts. Introduced in the West Indies. A large genus spread all over the tropics, and extending into the temperate zones in North America, Eastern Asia, South America, South Africa, and Australia. Several of the species are very widely dispersed.

Desmodium latifolium, DC.

Desmodium latifolium, DC.; Miq., Fl. Ind. Bat., i. 1, p. 246; Hook. f., Fl. Brit. Ind., ii. p. 168; Oliver, Fl. Trop. Afr., ii. p. 162 (sub. *Desmodio lasiocarpo*).

Timor Laut.—Common in the Archipelago, in India, the Mascarene Islands, and Tropical Africa, though hitherto not collected in Australia. It exists as an introduced plant in the West Indies. There is a specimen of another species of this affinity in Timor Laut; perhaps *Desmodium megaphyllum*, Zoll.

Desmodium polycarpum, DC.

Desmodium polycarpum, DC.; Miq. Fl. Ind. Bat., i. 1, p. 242; Benth., Fl. Austr., ii. p. 235; Seem., Fl. Vit., p. 56; Hook. f., Fl. Brit. Ind., ii. p. 171; Oliver, Fl. Trop. Afr., ii. p. 165; Nadeaud, Enum. Pl. Tahiti, p. 79.

Timor Laut.—North Australia to Japan, China, and the Himalayas; also in the Mascarene Islands and Eastern Tropical Africa, as well as many of the islands of the South Pacific, from the Fijis to the Marquesas.

Desmodium laxiflorum, DC.

Desmodium laxiflorum, DC.; Miq., Fl. Ind. Bat., i. 1, p. 251; Hook. f., Fl. Brit. Ind., ii. p. 164.

Timor Laut.—Scattered in the Archipelago, eastward to the Philippines, and through Java to North-western India.

Desmodium ormocarpoides, DC.

Desmodium ormocarpoides, DC.; Miq., Fl. Ind. Bat., i. 1, p. 249; Hook. f., Fl. Brit. Ind., ii. p. 164.

Babar.—Sumatra, Philippines, Ceylon, and the Western Peninsula of India. There is some doubt respecting the Babar plant being exactly this species.

Desmodium umbellatum, DC.

Desmodium umbellatum, DC. ; Miq., Fl. Ind. Bat., i. 1, p. 262 ; Benth., Fl. Austr., ii. p. 230 ; Hook. f., Fl. Brit. Ind., ii. p. 161 ; Seem., Fl. Vit., p. 56.
Dendrolobium umbellatum, Wight and Arnott ; Miq., Fl. Ind. Bat., i. 1, p. 262.

Arrou ; Ki ; Timor Laut.—North-eastern Australia ; many of the Pacific Islands ; throughout the Indian Archipelago and Malayan Peninsula ; Mascarene Islands ; Eastern Tropical Africa : often found on the sea-beach. It is naturalised in the West Indies.

Uraria crinita, DC. var.

Uraria crinita, DC. var. ; Miq., Fl. Ind. Bat., i. 1, p. 268 ; Hook. f., Fl. Brit. Ind., ii. p. 155.

Timor Laut.—Timor to China, and throughout India. *Uraria lagopoides*, DC., has nearly the same distribution, and is also found in North Australia and many of the islands of Eastern Polynesia.

Phylacium bracteosum, Bennett.

Phylacium bracteosum, Bennett in Horsf. Pl. Jav., p. 159, t. 23 ; Miq., Fl. Ind. Bat., i. 1, p. 228.

Ki ; Timor Laut.—A monotype, restricted, so far as at present known, to the Indian Archipelago. There are specimens in the Kew Herbarium from Java and Amboina.

Abrus precatorius, Linn.

Abrus precatorius, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 159 ; Benth., Fl. Austr., ii. p. 270 ; Seem., Fl. Vit., p. 63 ; Hook. f., Fl. Brit. Ind., ii. p. 175 ; Nadeaud, Enum. Pl. Tahiti, p. 81 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 104.

Wetter.—Universally spread in the tropics, and extending into some subtropical regions, growing equally well on the sea-shore and inland. Seemann states that it is common in the woods all over the Fijis ; but although it occurs in many of the smaller Pacific Islands, it does not appear to be plentiful. Often cultivated, and probably only a colonist in America.

Clitoria ternatea, Linn.

Clitoria ternatea, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 226 ; Hook. f., Fl. Brit. Ind., ii. p. 208 ; Seem., Fl. Vit., p. 74 ; Oliver, Fl. Trop. Afr., ii. p. 177.

Ki ; Letti.—Now very widely spread in tropical countries, especially where inhabited by civilised people ; but apparently absent from Australia, and certainly introduced into the Fiji Islands by foreign traders or missionaries, according to Seemann. It is one of the favourite garden flowers of hot countries, and is most likely of Indian origin. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 103) states that it was introduced into the Marquesas by the French. Nadeaud does not include it in his list of Tahitian plants.

Mucuna pruriens, DC.

Mucuna pruriens, DC.; Hook. f., Fl. Brit. Ind., ii. p. 187; Oliver, Fl. Trop. Afr., ii. p. 187; Griseb., Fl. Brit. W. Ind., p. 198.
Mucuna prurita, Hook.; Miq., Fl. Ind. Bat., i. 1, p. 211.

Wetter; Dia.—Commonly cultivated and now almost cosmopolitan in the tropics, though doubtless in many parts only a colonist, as it is wanting in North Australia, and it is not included in Seemann's Flora Vitiensis. Further, there are no Polynesian specimens in the Kew Herbarium.

Mucuna bracteata, Roxb.?

Mucuna bracteata, Roxb.? Hook. f., Fl. Brit. Ind., ii. p. 186.

Timor Laut.—This species has a wide range in India, but we have seen no Archipelago specimens that could be referred to it without doubt.

Mucuna (Stizolobium) sp.

Timor Laut.—Insufficient for satisfactory determination. A species of *Mucuna* likely to occur in the South-eastern Moluccas, but of which we have seen no insular specimens eastward of Timor, is *Mucuna gigantea*, DC. This species has a very wide range in Tropical Asia, Australia, and Polynesia, from the Fijis to the Sandwich Islands. It is one of the gigantic climbers that interlace the forests of *Paritium*, *Barringtonia*, *Calophyllum*, *Thespesia*, &c., that succeed the Mangroves which grow below high-water mark. Both Seemann and Nadeaud specially mention this species.

Galactia tenuiflora, Wight and Arnott var.?

Galactia tenuiflora, Wight and Arnott var.? Miq., Fl. Ind. Bat., i. 1, p. 220; Benth., Fl. Austr., ii. p. 255; Hook. f., Fl. Brit. Ind., ii. p. 192.

Timor Laut.—North Australia to the Himalayas; Tropical and South Africa; Tropical America; but not in Polynesia.

Canavalia ensiformis, DC.

Canavalia ensiformis, DC.; Hook. f., Fl. Brit. Ind., ii. p. 195; Oliver, Fl. Trop. Afr., ii. p. 190.
Canavalia gladiata, DC.; Miq., Fl. Ind. Bat., i. 1, p. 216; Griseb., Fl. Brit. W. Ind., p. 197.

Arrou; Timor Laut.—Common nearly all over Tropical Asia, Africa, and America, especially in maritime districts; but apparently wanting in Australia and the Pacific Islands. It is extensively cultivated.

Canavalia obtusifolia, DC.

Canavalia obtusifolia, DC.; Miq., Fl. Ind. Bat., i. 1, p. 215; Benth., Fl. Austr., ii. p. 256; Seem., Fl. Vit., p. 58; Nadeaud, Enum. Pl. Tahiti, p. 79; Hook. f., Fl. Brit. Ind., ii. p. 196.

Timor Laut.—Common on sandy coasts in all tropical countries, including most of the Pacific Islands from which we have botanical collections.

Vigna lutea, A. Gray.

Vigna lutea, A. Gray, Wilkes' U.S. Expl. Exped. Bot., i. p. 452; Benth., Fl. Austr., ii. p. 259; Seem., Fl. Vit., p. 62; Oliver, Fl. Trop. Afr., ii. p. 206; H. Mann in Proc. Amer. Acad., vii. p. 164; Nadeaud, Enum. Pl. Tahiti, p. 80.

Timor Laut.—A common sea-coast plant in warm countries of both hemispheres, including many of the Pacific Islands, from the Fijis to the Sandwich Islands. It is often associated with *Canavalia obtusifolia* and *Ipomœa pes-caprœ*.

Vigna luteola, Benth.

Vigna luteola, Benth. Fl. Austr., ii. p. 260; Hook. f., Fl. Brit. Ind., ii. p. 205; Oliver, Fl. Trop. Afr., ii. p. 205.

Timor Laut.—This likewise is a very widely spread plant, though not so common as *Vigna lutea*. Besides these two very common species there are several others spread over the warm regions of both hemispheres, including two endemic in the Sandwich Islands.

Psophocarpus tetragonolobus, DC.

Psophocarpus tetragonolobus, DC.; Hook. f., Fl. Brit. Ind., ii. p. 211; Miq., Fl. Ind. Bat., i. 1, p. 181.

Timor Laut.—A commonly cultivated herb, and occurring in a wild state from Timor to the Philippines and India. The genus comprises four species, natives of Tropical Asia and Africa. *Psophocarpus longepedunculatus* is even more widely diffused as a colonist escaped from cultivation.

Dolichos lablab, Linn.

Dolichos lablab, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 209; Oliver, Fl. Trop. Afr., ii. p. 210; H. Mann in Proc. Amer. Acad., vii. p. 164.
Lablab vulgaris, Savi; Seem., Fl. Vit., p. 62; Miq., Fl. Ind. Bat., i. 1, p. 189.

Timor Laut.—Cultivated generally in the tropics, and also existing in a wild state. Like many other plants which seem to owe their wide distribution to cultivation, rather than other means, this is not found in Australia.

Cajanus indicus, Linn.

Cajanus indicus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 174; Hook. f., Fl. Brit. Ind., ii. p. 217; Oliver, Fl. Trop. Afr., ii. p. 216; Griseb., Fl. Brit. W. Ind., p. 191; Seem., Fl. Vit., p. 74; H. Mann in Proc. Amer. Acad., vii. p. 164.

Babar; Timor Laut.—A monotype, cultivated and wild almost throughout the tropics; but where it is really indigenous is uncertain. It is not found in Australia, and when Seemann visited the Fijis it only existed there as a garden plant.

Flemingia strobilifera, R. Br.

Flemingia strobilifera, R. Br.; Miq., Fl. Ind. Bat., i. 1, p. 161; Hook. f., Fl. Brit. Ind., ii. p. 227.

Babar; Letti; Timor Laut.—Northward to the Philippines, and throughout India to Simla and Kumaon in the north-west. Naturalised in the Mauritius and West Indies. The genus comprises about twenty-five species restricted to the Old World; several of them inhabit Australia and Africa.

Derris uliginosa, Benth.

Derris uliginosa, Benth., Fl. Austr., ii. p. 272; Miq., Fl. Ind. Bat., i. 1, p. 141; Hook. f., Fl. Brit. Ind., ii. p. 241; Oliver, Fl. Trop. Afr., ii. p. 245; Seem., Fl. Vit., p. 65.

Arrou.—A common seaside climbing shrub, ranging from Polynesia, Northern Australia, and South-eastern Africa to China, Madagascar, and India. Seemann says:—"Grows plentifully on the sea beach, and by its long running root-stock helps to keep the same together. The flowers appear from every part of the plant, occasionally even from the roots." It has been collected in the Tongan Islands, Erromanga, New Hebrides, and New Caledonia. *Derris* is represented in America by three species, the rest being Asiatic; the present being the only one hitherto collected in Africa.

Pongamia glabra, Vent.

Pongamia glabra, Vent.; Miq., Fl. Ind. Bat., i. 1, p. 147; Benth., Fl. Austr., ii. p. 273; Hook. f., Fl. Brit. Ind., ii. p. 240; Seem., Fl. Vit., p. 65.

Timor Laut.—Northern Australia and Polynesia, through the Archipelago to the Himalayas; also in the Seychelles. In the Archipelago and Polynesia it seems to be essentially a coast plant; and Seemann says it always grows near the sea-beach in the Fijis, for which reason it has been called "vesi ni wai," *i.e.*, water vesi. The genus is monotypic.

Inocarpus edulis, Linn.

Inocarpus edulis, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 888; Nadeaud, Enum. Pl. Tahiti, p. 81; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 113; Seem., Fl. Vit., p. 70.

Timor Laut.—A large tree generally spread over the Archipelago and Polynesia, from the Fijis to the Marquesas. It furnishes an edible fruit, and it possesses, according to Seemann, extraordinary power of reproduction from seed. It is common in New Guinea, but does not reach either Australia or the Sandwich Islands. Even in the Marquesas, at the extreme eastern limit of its area, it forms dense woods of considerable extent, but the individual trees do not attain the gigantic size they do in New Guinea and the Fiji Islands.

Sophora tomentosa, Linn.

Sophora tomentosa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 124; Seem., Fl. Vit., p. 66; Benth., Fl. Austr., ii. p. 274; Hook. f., Fl. Brit. Ind., ii. p. 249; Nadeaud, Enum. Pl. Tahiti, p. 81; Griseb., Fl. Brit. W. Ind., p. 203.

Arrou; Timor Laut.—A generally diffused tree on tropical sea-coasts, extending into some subtropical regions. It is common on the sea-beach of many of the Pacific Islands, though not reaching the Marquesas or Sandwich Islands, where it is replaced by other species. Nadeaud notes that it is common, especially on coral islands; and Seemann states that it is common on the sea-beach throughout the Fijis. In the Atlantic it extends to the Bermudas. The genus comprises between twenty and thirty species, spread over the warmer regions of both hemispheres. Several of the species have a wide geographical area, including *Sophora tetraptera*, which is widely spread in the south temperate zone; particulars of its distribution will be found on page 32 of this Part.

Cæsalpinieæ.

Peltophorum ferrugineum, Benth.

Peltophorum ferrugineum, Benth., Fl. Austr., ii. p. 279; Hook. f., Fl. Brit. Ind., ii. p. 257.
Cæsalpinia ferruginea, Dcne.; Miq., Fl. Ind. Bat., i. 1, p. 111.

Dammar; Timor Laut.—North Australia to the Philippines and Singapore, Malacca, and the Andamans. The genus consists of about five species, two of which are American, and one African.

Cæsalpinia nuga, Ait.

Cæsalpinia nuga, Ait.; Miq., Fl. Ind. Bat., i. 1, p. 108; Benth., Fl. Austr., ii. p. 277; Hook. f., Fl. Brit. Ind., ii. p. 255; Seem., Fl. Vit., p. 66.

Timor Laut.—Northern Australia and New Hebrides to the Philippines, Southern China, and nearly the whole of Tropical India. The genus is a considerable one, and generally spread over the tropics.

Cæsalpinia pulcherrima, Swartz.

Cæsalpinia pulcherrima, Swartz; Miq., Fl. Ind. Bat., i. 1, p. 111; Hook. f., Fl. Brit. Ind., ii. p. 255; Oliver, Fl. Trop. Afr., ii. p. 262; Griseb., Fl. Brit. W. Ind., p. 205.

Timor Laut.—This handsome tree is cultivated and more or less wild in nearly all tropical countries, except Australia, and it is uncertain where it is really indigenous, though probably in some part of the Old World.

Cæsalpinia bonducella, Fleming.

Cæsalpinia bonducella, Fleming; Hook. f., Fl. Brit. Ind., ii. p. 254; Oliver, Fl. Trop. Afr., ii. p. 262; Seem., Fl. Vit., p. 66.
Guilandina bonducella, Linn.; Benth., Fl. Austr., ii. p. 276; Griseb., Fl. Brit. W. Ind., p. 204; Nadeaud, Enum. Pl. Tahiti, p. 81.
Guilandina bonduc, Miq., Fl. Ind. Bat., i. 1, p. 113, *partim.*

Timor Laut.—Almost cosmopolitan in the tropics, and, although essentially a seaside plant in the Indian Archipelago and Polynesia, it reaches the Himalayas in India, as far to the north-west as Kumaon. Nadeaud states that it was the only spiny plant in Tahiti before the arrival there of Europeans. The hard seeds are conveyed [in their light prickly pods ?] long distances by oceanic currents, without losing the power of germinating. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 105) enumerates, probably by mistake, the allied *Cæsalpinia bonduc*, Roxb. (*Guilandina bonduc*, Linn.), and says that it is as common in the Marquesas as brambles are in Europe. H. Mann (in Proc. Amer. Acad., vii. p. 164) also records the latter from the Sandwich Islands, but the only specimens in the Kew Herbarium from the Sandwich, Friendly, and Society Islands are certainly *Cæsalpinia bonducella*, from which *Cæsalpinia bonduc* differs in having yellow seeds, larger less hairy leaflets, and especially in having no conspicuous stipules. *Cæsalpinia bonduc* is a much rarer plant than *Cæsalpinia bonducella;* the only Polynesian specimen in the Kew Herbarium being from the Fijis and Norfolk Island.

Cassia fistula, Linn.

Cassia fistula, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 89; Hook. f., Fl. Brit. Ind., ii. p. 261; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 514.

Ki; Moa.—Mr Bentham regards this species, which is highly ornamental and commonly planted in tropical countries, as truly indigenous in the Archipelago and India, and possibly, though not probably so, in Africa, and as introduced in America. It is another instance of a widely dispersed tropical plant that does not reach Australia. *Cassia* comprises between three and four hundred species, varying in habit and duration from annual herbs to gigantic trees, and generally spread over the tropical and subtropical regions of both hemispheres, but most numerous in America. A few herbaceous species inhabit North America, reaching New England and Illinois.

Cassia alata, Linn.

Cassia alata, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 93; Hook. f., Fl. Brit. Ind., ii. p. 264; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 550.

Timor Laut.—This species is now spread over Tropical Asia, Africa, and America, but it is only in the last country that it is universal, and it is perhaps not indigenous in the Old World. It has not been collected in Australia.

Cassia javanica, Linn.

Cassia javanica, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 90; Hook. f., Fl. Brit. Ind., ii. p. 267; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 517.

Ki; Timor Laut.—Amboina to Java, and perhaps the Malayan Peninsula.

Cassia sophera, Linn.

Cassia sophera, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 92; Benth., Fl. Austr., ii. p. 283; Hook. f., Fl. Brit. Ind., ii. p. 262; Seem., Fl. Vit., p. 67; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 532.

Letti.—Concerning this species Mr Bentham says: "Tropical Asia, Africa, and Australia, more rare in Tropical America, chiefly in Central America, the West Indian Islands, and Columbia; in all continents most frequently only from cultivation, or escaped from cultivation, with some evidence of being really indigenous in Australia, and more doubtfully so in Asia and America."

Seemann records it only from waste places in the Fijis. Forster collected it in the Tongan Islands, and Sir E. Horne in Uvea or Wallis Island.

Cassia tora, Linn.

Cassia tora, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 95; Hook. f., Fl. Brit. Ind., ii. p. 263; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 535.

Timor Laut.—Generally spread in Tropical Asia, Africa, and America, and certainly truly indigenous in the first named country, if not in the others. It is common in cultivated and waste ground, especially in America, where it extends northward to South Carolina. Mr Bentham records it from Australia, but we find no specimens, and it is not included in his Flora, so we think it is an error.

Cassia megalantha, Dcne. ?

Cassia megalantha, Dcne.? Miq., Fl. Ind. Bat., i. 1, p. 90; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 517.

Timor Laut.—Only recorded from Timor previously. It is allied to *Cassia javanica*.

Cassia mimosoides, Linn.

Cassia mimosoides, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 101; Benth., Fl. Austr., ii. p. 291; Hook. f., Fl. Brit. Ind., ii. p. 266; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 579.

Timor Laut.—Tropical Asia, Africa, Australia, and America, though rarer in the last named country.

Bauhinia blancoi, Baker.

Bauhinia blancoi, Baker in Hook. f., Fl. Brit. Ind., ii. p. 278.
Phanera blancoi, Benth., Pl. Jungh., p. 264.

Timor Laut.—Previously known only from the Philippine Islands and Siam. *Bauhinia* is a large genus spread all over the tropics.

Saraca sp. ?

Arrou.—An imperfect specimen of what may be a species of this genus, which is a small one restricted to Tropical Asia.

Cynometra ramiflora, Linn.

Cynometra ramiflora, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 78; Benth., Fl. Austr., ii. p. 296; Hook. f., Fl. Brit. Ind., ii. p. 267.

Timor Laut.—North Australia to the Philippines, the Malayan and Western Peninsulas of India, and in Ceylon. The genus numbers about twenty species, distributed over the tropical regions of both hemispheres; two species inhabit the Fiji and Tongan Islands.

Mimoseæ.

Entada scandens, Benth.

Entada scandens, Benth., Fl. Austr., ii. p. 298; Seem., Fl. Vit., p. 71; Hook. f., Fl. Brit. Ind., ii. p. 287; Oliver, Fl. Trop. Afr., ii. p. 325.
Entada pursætha, DC.; Miq., Fl. Ind. Bat., i. 1, p. 45.
Faba marina seu parang, Rumph., Herb. Amboin., v. p. 5, t. 4.

Although we have not actually seen specimens of this from any of the islands within our limits, we have evidence of its existence, and being a very remarkable plant it deserves special mention. It is a gigantic climber, bearing the largest seed-vessel of any member of the order to which it belongs, it often attaining a length of three to four, and sometimes six to eight feet, with a breadth of four or five inches; and the seeds are sometimes as much as two inches in diameter.

This plant has a very wide range in the tropics of both hemispheres, that is, if the eastern and western specimens be correctly referred to one species, which is not beyond doubt. It is found in North Australia, and northward to the Marianne Islands, and the north of India, growing apparently equally as well on the sea-shore as on the Himalaya Mountains. Seemann (Kittlitz, Views of the Vegetation of the Pacific, p. 22) states that this is the only real climbing plant in the Mangrove swamps of the Pacific Islands, where, in the Fijis, for instance, he had seen festoons of it several hundred yards long. As already mentioned in this Report, Part II., p. 80, the seeds are conveyed enormous distances by oceanic currents without losing their vitality. This fact would account for its present wide distribution. Many other members of this order especially, included in this list, doubtless owe their wide dispersion to the same cause.

Dichrostachys nutans, Benth.

Dichrostachys nutans, Benth. in Trans. Linn. Soc. Lond., xxx. p. 382; Oliver, Fl. Trop. Afr., ii. p. 333.
Dichrostachys cinerea, Miq., Fl. Ind. Bat., i. 1, p. 48, *quoad plantam Javanicam, fide* Benth., Fl. Austr., ii. p. 299.

Moa; Wetter.—North Australia and some of the islands of the Indian Archipelago, and common throughout Tropical Africa. This species is very closely allied to *Dichrostachys cinerea*, Wight and Arnott, a very common one in Tropical Asia. The genus is exclusively Old World.

Acacia farnesiana, Willd. ?

Acacia farnesiana, Willd. ? Miq., Fl. Ind. Bat., i. 1, p. 7; Benth., Fl. Austr., ii. p. 419; Hook. f., Fl. Brit. Ind., ii. p. 292; Benth. in Trans. Linn. Soc. Lond., xxx. p. 502.

Letti.—This species is a favourite cultivated plant in the tropics on account of the delightful fragrance of its flowers; and it also exists in a wild state in nearly all warm countries. Respecting its distribution, Mr Bentham, *loc. cit.*, says: "Widely spread over the tropical and subtropical regions of the New and the Old World, but so generally cultivated for the perfume of its flowers, and so frequently established as an escape from cultivation, that it is difficult to determine where it is really indigenous. It appears, however, to be so in Western America, from Northern Chili to Texas, not, perhaps, in Brazil nor in Guiana; abundant in tropical and subtropical Northern-Central Australia, and in the interior of North-Eastern Australia, and perhaps also really indigenous in Tropical South Africa, but introduced only into the East Indies, Northern Tropical Africa, and the Mediterranean region." Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 107) and H. Mann (in Proc. Amer. Acad., vii. p. 165), both treat it as certainly introduced in Eastern Polynesia.

Acacia numbers nearly 450 species, generally spread over the warmer parts of the world, but most numerous in Australia and Africa; in the former there are nearly 300, and, with the single exception of *Acacia farnesiana,* they are endemic.

ROSACEÆ.

Parinarium sp.

Wetter.—*Parinarium* is a genus of about forty arboreous species, generally spread in tropical countries; the seed-vessel has a hard woody endocarp.

Rubus glomeratus, Blume.

Rubus glomeratus, Blume; Miq., Fl. Ind. Bat., i. 1, p. 381; Hook. f., Fl. Brit. Ind., ii. p. 328.

Dammar.—Also found in Java, Borneo, the Philippines, and in Penang. This is allied to the very variable *Rubus moluccanus,* which is exceedingly common and generally spread in Tropical Asia. Genus very widely dispersed, though very few species are found in south temperate regions.

CRASSULACEÆ.

Bryophyllum calycinum, Salisb.

Bryophyllum calycinum, Salisb.; Hook. f., Fl. Brit. Ind., ii. p. 413; Oliver, Fl. Trop. Afr., ii. p. 390.

Ki; Timor Laut.—This plant is now very widely dispersed in tropical and subtropical countries, except Australia, but it is probable that it is only indigenous in Africa. It has been carried from place to place as a curiosity, from the fact that a very small

portion of a leaf will, under favourable conditions, grow into an independent plant. Possessing this viviparous property the plant multiplies itself at a prodigious rate, and as stated in Part I., p. 31, it is one of the commoner plants in the Bermudas.

RHIZOPHOREÆ.

Rhizophora mucronata, Lam.

Rhizophora mucronata, Lam.; Miq., Fl. Ind. Bat., i. 1, p. 583; Benth., Fl. Austr., ii. p. 493; Hook. f., Fl. Brit. Ind., ii. p. 435; Seem., Fl. Vit., p. 91.

Arrou; Timor Laut.—This is one of the commonest of the Mangroves in the tidal swamps of Tropical Asia, insular and continental; it is also in Eastern Africa, Northern Australia, the Fiji, Samoan, and other islands of Polynesia. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149) enumerates "*Rhizophora mangle*, Linn." as a native of New Caledonia, the Archipelago, &c.; but Miquel is probably right (Fl. Ind. Bat., i. 1, p. 584) where he says, "*Rhizophora mangle*, Linn., et al. ex parte quoad stirpem gerontog." The true *Rhizophora mangle*, Linn., appears to be restricted to America and Western Africa; see Part I., p. 32.

Bruguiera rheedii, Blume?

Bruguiera rheedii, Blume? Miq., Fl. Ind. Bat., i. 1, p. 587; Benth., Fl. Austr., ii. p. 494; Seem., Fl. Vit., p. 91.

Dammar.—A common Mangrove, ranging from Northern Australia to Sumatra, and in Western Polynesia. In the Flora of British India (ii. p. 437), this species is reduced to *Bruguiera gymnorhiza*, Lam., which gives it a much wider range in Tropical Asia, the Mascarene Islands, and Eastern Africa. In Oliver's Flora of Tropical Africa (ii. p. 409), the African species of this genus is named *Bruguiera cylindrica*, Blume, with a note to the effect that it is probably not distinct from *Bruguiera gymnorhiza*, Blume, and *Bruguiera capensis*, Blume. It is described as the commonest and handsomest of the Zambesi Mangroves, extending farther inland than the others, though equally littoral. In appearance, these so-called species are so much alike that they may well be one.

Bruguiera caryophylloides, Blume?

Bruguiera caryophylloides, Blume? Miq., Fl. Ind. Bat., i. 1, p. 589; Hook. f., Fl. Brit. Ind., ii. p. 438.

Arrou.—Tidal forests of the Archipelago and India, from Malabar to Malacca and Ceylon. The specimens of this and the preceding from the Moluccas are too imperfect for the species to be determined with absolute certainty. *Bruguiera* is not represented in America.

Anisophyllea sp.?

Dia.—A somewhat anomalous genus of this order, comprising about half-a-dozen species, restricted to Tropical Asia.

COMBRETACEÆ.

Terminalia sp.

Ki.—A large genus of trees, generally spread in the tropics, and common in the Indian Archipelago and Australia. *Terminalia catappa*, the Indian Almond, is now found nearly all over the area of the genus.

Lumnitzera coccinea, Wight and Arnott.

Lumnitzera coccinea, Wight and Arnott; Miq., Fl. Ind. Bat., i. 1, p. 606; Benth., Fl. Austr., ii. p. 503; Hook., f., Fl. Brit. Ind., ii. p. 452; Seem., Fl. Vit., p. 94.

Timor Laut.—A common tree in the Mangrove swamps of the Archipelago and the Malayan Peninsula, extending to the Fijis and Northern Australia. Another species, *Lumnitzera racemosa*, has the same range as the present, and is also found in the Western Peninsula of India, in Ceylon, and in Eastern Africa.

Quisqualis sp.

Wetter.—*Quisqualis* is a genus of four or five species, one of which is African, and the rest Asiatic; and *Quisqualis indica*, the commonest of them, is cultivated generally in the tropics, and is wild throughout the Archipelago and India. The present plant may be that species.

Gyrocarpus jacquini, Roxb.

Gyrocarpus jacquini, Roxb.; Hook. f., Fl. Brit. Ind., ii. p. 461; Benth., Fl. Austr., ii. p. 505; Seem., Fl. Vit., p. 95; Oliver, Fl. Trop. Afr., ii. p. 435.
Gyrocarpus asiaticus, Willd.; Miq., Fl. Ind. Bat., i. 1, p. 978.
Gyrocarpus americanus, Jacq.; DC., Prodr., xv. 1, p. 247.

Timor Laut.—This tree grows in maritime districts throughout the tropics, but it is comparatively rare in America, and especially in Africa, being only recorded from Angola. In America it ranges from Mexico to Venezuela and New Grenada. The seed-vessel is crowned by two long wings, giving it the appearance of a small shuttlecock.

MYRTACEÆ.

Melaleuca leucadendron, Linn.

Melaleuca leucadendron, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 401; Benth., Fl. Austr., iii. p. 142; Hook. f., Fl. Brit. Ind., ii. p. 465.;

Timor Laut.—Common in Tropical Australia, and throughout the Indian Archipelago to Cochin-China, Malacca, and Mergui in the Malayan Peninsula. A very variable species,

both in Australia itself and in the Archipelago, and several forms have been described as species. It is one of the few essentially Australian types that extend beyond Australia (New Caledonia being regarded as belonging to the same floral region). In Australia proper there are between ninety and a hundred species of *Melaleuca*, presenting a great diversity in foliage and inflorescence; but *Melaleuca leucadendron* is the only one, we believe, found north of Australia. As limited in the Flora of British India, it includes *Melaleuca minor*, Smith, *Melaleuca saligna*, Blume, *Melaleuca viridiflora*, Gært., *Melaleuca cumingiana* and *Melaleuca lanceolata*, Turcz., and *Melaleuca cajuputi*, Roxb.

The other specially Australian myrtaceous types, extending into the Archipelago and Continental Asia, are:—*Bœckea frutescens*, Linn.—Malacca and South China, to Borneo and Sumatra; *Leptospermum amboinense*, Blume—Malacca to Australia and Tasmania; *Leptospermum javanicum*, Blume—Moulmein, Java, and Sumatra. *Bœckea* numbers about fifty Australian species, and *Leptospermum* twenty-five, whereof two inhabit New Zealand, and the rest Australia.

Rhodomyrtus macrocarpa, Benth. var.?

Rhodomyrtus macrocarpa, Benth. var.? Fl. Austr., iii. p. 273.

Arrou.—Only recorded from Queensland. *Rhodomyrtus* is a genus of five species, four of which are Australian, and one, *Rhodomyrtus tomentosa*, DC., which is spread nearly all over Tropical Asia.

Nelitris paniculata, Lindl.

Nelitris paniculata, Lindl.; Benth., Fl. Austr., iii. p. 279.
Nelitris pallescens, Miq., Fl. Ind. Bat. Suppl., i. p. 314.
Decaspermum paniculatum, Kurz in Journ. As. Soc. Beng., xlvi. (1877), 2, p. 61; Hook. f., Fl. Brit. Ind., ii. p. 470.

Ki.—North Australia to the Philippines and Bengal. With this exception, the genus is not known to be represented in Australia; the rest of the species being at home in the Indian Archipelago and Pacific Islands.

Eugenia javanica, Lam.?

Eugenia javanica, Lam.? Hook. f., Fl. Brit. Ind., ii. p. 474.
Jambosa alba, Rumph., Herb. Amb., i. p. 127, t. 39; Miq., Fl. Ind. Bat., i. 1, p. 413, *partim*.

Ki; Timor Laut.—Archipelago, and Malayan Peninsula. There is an imperfect specimen, from Ki Island, of another species of this vast and widely spread genus; a second from Arrou, and a third from Timor Laut.

Eugenia malaccensis, Linn.

Eugenia malaccensis, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 471.
Jambosa domestica, Rumph., Herb. Amb., i. p. 121, t. 37, *excl. quib. varr. fide Miq.*, Fl. Ind. Bat., i. 1, p. 411.
Jambosa malaccensis, DC., Prodr., iii. p. 286; Bot. Mag., t. 4408.

Arrou.—The specimen is hardly sufficient to enable us to be certain of its being this species, which, however, is very variable; it is generally cultivated in the Archipelago, as well as in other tropical countries. It is also an indigenous wild plant in the Archipelago.

Barringtonia speciosa, Linn. f.

Barringtonia speciosa, Linn. f., Suppl., p. 312; Forst., Char. Gen., t. 38; Benth., Fl. Austr., iii. p. 288; Hook. f., Fl. Brit. Ind., ii. p. 507; Miq., Fl. Ind. Bat., i. 1, p. 485; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 108, 135, 139, et 149; Seem., Fl. Vit., p. 82.

Arrou.—A maritime tree attaining gigantic proportions in some parts of the Archipelago. It is now generally spread in the region, and it extends to the shores of the Malayan Peninsula, and some other parts of India, though Beddome (Forester's Manual of Botany for Southern India, p. 112) believes it is not wild in the Western Peninsula, though common enough on the coast of Ceylon. It is also common in Madagascar, the Seychelles, Mauritius, and westward to the Comoro Islands, but hitherto it has not been found on the coast of Continental Africa. Southward it reaches North Australia, and it is found throughout Polynesia, being one of the first plants, according to Jouan, to invade the coral islands; the very large, square, light, fibrous fruit being one of those most commonly and abundantly conveyed from place to place by oceanic currents. It is not recorded from the Sandwich Islands; but Mr J. S. Arundel lately collected it in the remote Ducie Island; and it has also been sent to the Kew Herbarium from Diego Garcia, Chagos Islands. *Barringtonia* does not reach the American continent.

Barringtonia racemosa, Bume.

Barringtonia racemosa, Blume; Miq., Fl. Ind. Bat., i. 1, p. 486; Seem., Fl. Vit., p. 83; Hook. f., Fl. Brit. Ind., ii. p. 507; Oliver, Fl. Trop. Afr., ii. p. 438.

Arrou; Wetter.—This is also a seaside tree, as indeed are all the species of the genus, and is nearly as widely dispersed as *Barringtonia speciosa;* but it is not reported from Australia, and it is less generally diffused in Polynesia. On the other hand, it is commoner on the Indian coast, and it is abundant, in some parts at least, on the eastern coast of Tropical Africa. The fruit of *Barringtonia racemosa* is much smaller than that of *Barringtonia speciosa.* There is an imperfect specimen of a third species of this genus from Timor Laut.

LYTHRACEÆ.

Pemphis acidula, Forst.

Pemphis acidula, Forst.; Miq., Fl. Ind. Bat., i. 1, p. 619; Benth., Fl. Austr., iii. p. 300; Hook. f., Fl. Brit. Ind., ii. p. 573; Oliver, Fl. Trop. Afr., ii. p. 482; Nadeaud, Enum. Pl. Tahiti, p. 78.

Arrou; Ki; Maru; Timor Laut.—An exceedingly common seaside shrub in many parts of the tropics of the Old World, including the eastern coast of Africa. It is also in many of the coral islands of Polynesia, though not exclusively on coral islands, as the Rev. T. Powell states on a label in the Kew Herbarium, for Barclay collected it in Tahiti, and Wright collected it in Loochoo, and Chamisso collected it in Romanzoff Island. Seemann does not include it in his Flora Vitiensis, nor are there specimens thence in the Kew Herbarium. Dr Coppinger, of H.M.S. "Nassau," collected it in Du Lise Island, Gloriosa Group, and Poivre Island, Amirante group, in 1882. Seed-vessel small and dry, containing numerous small, light, angular seeds. Darwin, as quoted by Henslow (Annals of Natural History, i. p. 340), says of this shrub: "No sooner has a new reef become sufficiently elevated by the accumulation of sand upon its surface, but this plant is sure to be the first to take possession of the soil." *Ipomæa biloba* (*Ipomæa pes-capræ*) is another plant that forms part of the earliest phanerogamic vegetation in such situations.

SAMYDACEÆ.

Casearia sp.

Moa; Lakor.—The genus *Casearia* is a large one, generally spread in the tropics, but most numerous in America.

CUCURBITACEÆ.

Luffa ægyptiaca, Miller.

Luffa ægyptiaca, Miller; Miq., Fl. Ind. Bat., i. p. 666; Benth., Fl. Austr., iii. p. 316; Hook. f., Fl. Brit. Ind., ii. p. 614; Oliver, Fl. Trop. Afr., ii. p. 530.
Luffa cylindrica, Rœm., Synops., ii. p. 63.
Luffa insularum, A. Gray, U.S. Expl. Exped., Bot. i. p. 644.

Ki; Larat; Wetter; Timor Laut.—Commonly cultivated throughout the tropics for the fruit, which is eaten in a young state. The ripe fruit is ultimately fibrous and very light, and the plant is consequently very widely dispersed in a wild state. There are several allied species not easily distinguishable in the absence of ripe fruit. *Luffa insularum* is a common maritime form in the Fiji, Tahiti, Tongan Islands, &c. Cogniaux (in DC. Monogr. Phanerog., iii. p. 456) retains Rœmer's name, *Luffa cylindrica*, for this species, reducing to it a number of species of various botanists.

Citrullus vulgaris, Schrad.

Citrullus vulgaris, Schrad. ; Hook. f., Fl. Brit. Ind., ii. p. 621 ; Seem., Fl. Vit., p. 104 ; Oliver, Fl. Trop. Afr., ii. p. 549.
Citrullus edulis, Spach. ; Miq., Fl. Ind. Bat., i. 1, p. 662.
Cucurbita citrullus, Linn. ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149.

Moa.—The Water-melon exists in a wild and cultivated state in nearly all tropical and many subtropical countries, but it is believed to be really indigenous only in Tropical Africa. It is cultivated, and more or less wild, in many of the islands of Polynesia, where, however, according to Seemann, it is known to have been introduced by Europeans.

Momordica charantia, Linn.

Momordica charantia, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 663 ; Hook. f., Fl. Brit. Ind., ii. p. 616 ; Oliver, Fl. Trop. Afr., ii. p. 537 ; Seem., Fl. Vit., p. 105.

Timor Laut.—Commonly cultivated and naturalised in tropical countries, and probably indigenous in Tropical Africa. Seemann collected it in the Fijis, and he mentions that it was collected in Tahiti by Banks and Solander. *Momordica balsamina*, Linn., has nearly the same range as the present, and also extends to Australia. Both species are regarded by Cogniaux (DC., Monogr. Phanerog., iii. pp. 437 et 440) as introduced in America.

Lagenaria vulgaris, Seringe.

Lagenaria vulgaris, Seringe ; Benth., Fl. Austr., iii. p. 316 ; Miq., Fl. Ind. Bat., i. 1, p. 669 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149 ; Seem., Fl. Vit., p. 106 ; Nadeaud, Enum. Pl. Tahiti, p. 66.

The Calabash Gourd, generally cultivated for the fruit, which is not eaten, but used for making bottles, &c. It was found in Easter Island, the Sandwich Islands, and other parts of Polynesia, when first discovered by Europeans.

Cucumis trigonus, Roxb. ?

Cucumis trigonus, Roxb. ? Hook. f., Fl. Brit. Ind., ii. p. 619 ; Benth., Fl. Austr., iii. p. 317 ; Miq., Fl. Ind. Bat., i. 1, p. 671 (*Cucumis turbinatus*).

Timor Laut.—Generally diffused in Tropical Asia and extending to North Australia.

Zehneria sp. (aff. *Zehneriæ mucronatæ*, Miq.)

Timor Laut.—The species may be different from the Java plant. *Zehneria*, as circumscribed by Bentham and Hooker, is confined to the Old World, with the exception of one species in Peru.

Bryonia sp. (aff. *Bryoniæ laciniosæ*, Linn.)

Timor Laut.—Probably only a variety of *Bryonia laciniosa*, which is generally spread in the tropics of the Old World.

FICOIDEÆ.

Sesuvium portulacastrum, Linn.

Sesuvium portulacastrum, Linn.; Benth., Fl. Austr., iii. p. 328; Hook. f., Fl. Brit. Ind., ii. p. 659; Miq., Fl. Ind. Bat., i. 1, p. 1060 (*Sesuvium repens*, Willd.); Nadeaud, Enum. Pl. Tahiti, p. 67; Guillemin in Ann. Sci. Nat., sér. 2, vii. p. 350.

Maru.—This perennial herb is common, especially on sandy sea-shores throughout tropical and subtropical regions, including many remote islands; as the Bermudas, Ascension, St Helena, Easter Island, the Sandwich Islands, the Phœnix group, &c. It often grows where it is covered at high water. In the Galapagos is a species, *Sesuvium edmonstonei*, which is endemic.

UMBELLIFERÆ.

Carum roxburghianum, Benth.

Carum roxburghianum, Benth.; Hook. f., Fl. Brit. Ind., ii. p. 682.
Apium involucratum, Roxb., Hort. Beng., p. 22, et Fl. Ind., ii. p. 97; Wight, Ic. Pl. Ind. Or., t. 567.
Ptychotis roxburghiana, DC.; Miq., Fl. Ind. Bat., i. 1, p. 737.

Timor Laut.—This is cultivated throughout India, and in some parts of the Archipelago, but it is not known where it is indigenous. It is probably a cultivated state of some other species.

ARALIACEÆ.

Delarbrea sp.

Timor Laut.—There are two described species of *Delarbrea*, both restricted to New Caledonia, unless this be the same as one of them, and, as far as the material goes, it is so like *Delarbrea paradoxa*, Vieill. (Ann. Sci. Nat., sér. 5, iii. p. 234), that it may be the same species.

Panax sp.

Timor Laut.—Probably only a variety of *Panax pinnatum*, Lam., which has a wide range in the Malayan Peninsula and Archipelago. The genus has a very wide range in the Old World southward to New Zealand.

Heptapleurum venulosum, Seem.

Heptapleurum venulosum, Seem., Rev. Heder., p. 44; Hook. f., Fl. Brit. Ind., ii. p. 729; Benth., Fl. Austr., iii. p. 384.
Paratropia elliptica, Miq., Fl. Ind. Bat., i. 1, p. 756.

Arrou ?—Widely dispersed in Tropical Asia, and extending to North Australia.

Polyscias sp. ?

ARROU and BABAR.—The genus *Polyscias* was founded by Forster on a Tana Island plant, which also occurs in Sumatra, and is the *Eupteron* of Miquel. Altogether, about eight species are known, and they inhabit India and the Archipelago, the Mascarene, and some of the Pacific Islands.

GAMOPETALÆ.

RUBIACEÆ.

Oldenlandia paniculata, Linn.

Oldenlandia paniculata, Linn.; Miq., Fl. Ind. Bat., ii. p. 191; Hook. f., Fl. Brit. Ind., iii. p. 69; Seem., Fl. Vit., p. 126.

ARROU; TIMOR LAUT.—Generally diffused in Tropical Asia, and in many of the islands of Polynesia, but not recorded from Australia. *Oldenlandia* is a large genus, chiefly Asiatic, but spread all over the tropics.

Ophiorrhiza n. sp. ?

ARROU.—This genus is a large one, and spread over the warmer parts of Asia and Australia, and it is also represented in Polynesia.

Mussænda sp.

DAMMAR.—*Mussænda* comprises about forty species, generally diffused in Tropical Asia and Africa, as well as Polynesia, yet apparently not represented in Australia.

Webera dallachiana, F. Muell.

Webera dallachiana, F. Muell.; Benth., Fl. Austr., iii. p. 412.

KI.—Elsewhere only recorded from Albany Island and Rockingham Bay, Queensland.

Randia sp.

TIMOR LAUT.—A genus of general distribution in tropical countries, several of the species inhabiting maritime districts.

Guettarda speciosa, Linn.

Guettarda speciosa, Linn.; Miq., Fl. Ind. Bat., ii. p. 262; Benth., Fl. Austr., iii. p. 419; Hook. f., Fl. Brit. Ind., iii. p. 126; Seem., Fl. Vit., p. 131; Nadeaud, Enum. Pl. Tahiti, p. 52.

ARROU; KI.—An exceedingly common tree in tidal forests in the Old World and Polynesia; it also grows some places inland, and is sometimes cultivated for the sake of its sweet-scented flowers. With the exception of the western coast of Tropical Africa, it is found on nearly all tropical coasts in the Old World; and it is found on most islands,

including the coral islands of Polynesia. It is common in the Seychelles; Dr Coppinger collected it in Poivre Island, Amirante group, and Wilford collected it in Pratas Island in the Chinese Sea, and there is a note accompanying his specimen in the Kew Herbarium to the effect that it formed the greater part of the vegetation of the island. Darwin collected it in the Keeling or Cocos Islands, and it is in the Kew Herbarium from Pitcairn, Elizabeth, and other remote islands of Polynesia. Seemann states that it is common on the sea-beaches of the Fijis, and it appears to be in almost every island of the Society, Tongan, and other Polynesian groups. It is, however, not recorded from the Sandwich Islands, nor from the Galapagos; nor have we seen any American specimens. The seed-vessel is light and fibrous, and easily conveyed by the waves of the sea; and it is among the drift fruits and seeds collected by Mr Moseley.

Ixora grandifolia, Zoll. and Morr.

Ixora grandifolia, Zoll. and Morr., Syst. Verz., p. 65; Hook. f., Fl. Brit. Ind., iii. p. 143.

Arrou; Timor Laut.—Andaman and Nicobar Islands to Malacca, Penang, and Singapore, and throughout the Archipelago.

In the Flora of British India, *Pavetta macrophylla*, Blume, and *Pavetta teysmanniana* and *Pavetta macrocoma*, Miq. (Fl. Ind. Bat., ii. p. 267–274), are regarded as varieties of this species, as also *Ixora arborescens*, Hassk.

Besides the following species of this genus, there are imperfect specimens of at least half-a-dozen others in the Kew Herbarium from the Eastern Moluccas. As limited in the Flora of British India, the genus comprises upwards of one hundred species, a very few of which are American.

Ixora timorensis, Dcne.

Ixora timorensis, Dcne.; Benth., Fl. Austr., iii. p. 415; Miq., Fl. Ind. Bat., ii. p. 278 (sub *Pavetta*).

Timor Laut.—This has been collected in several localities in North Australia and Queensland, as well as in Timor.

Ixora paludosa, Miq.?

Ixora paludosa, Miq.? Fl. Ind. Bat., ii. p. 271 (sub *Pavetta*).

Timor Laut.—A native of Java and Sumatra, growing near the coast.

Pavetta indica, Linn.

Pavetta indica, Linn.; Miq., Fl. Ind. Bat., ii. p. 275; Hook. f., Fl. Brit. Ind., iii. p. 150.
Ixora pavetta, Roxb., Fl. Ind., i. p. 385; Fl. Austr., iii. p. 414.

Arrou; Timor Laut.—Throughout Tropical Asia, and in many localities in North-East Australia.

Coffea bengalensis, Roxb.

Coffea bengalensis, Roxb.; Hook. f., Fl. Brit. Ind., iii. p. 153.
Coffea horsfieldiana, Miq., Fl. Ind. Bat., ii. p. 308.

Babar.—This tree ranges from the tropical parts of the Himalayas to Java and the present island. There is about a score of species of this genus in Tropical Africa and Asia, besides the coffee-yielding species *Coffea arabica* and *Coffea liberica*.

Since the appearance of the third volume of Oliver's Flora of Tropical Africa, Mr Hiern has published an elaborate monograph of the African species in the Transactions of the Linnean Society, Botany, N. S., i. p. 169.

Morinda citrifolia, Linn.

Morinda citrifolia, Linn.; Miq., Fl. Ind. Bat., ii. p. 242; Benth., Fl. Austr., iii. p. 423; Seem., Fl. Vit., p. 129; Hook. f., Fl. Brit. Ind., iii. p. 155; H. Mann in Proc. Amer. Acad., vii. p. 170; Nadeaud, Enum. Pl. Tahiti, p. 52; Jouan in Mém. Soc. Sci. Nat. Cherbourg, 1865, xi. p. 111.

Maru; Moa.—Generally diffused both on the coast and inland in Tropical Asia, Africa, and Polynesia; also occurring in North Australia.

The various economic applications of different parts of this tree may partly account for its very wide distribution, though Jouan expresses the opinion that its distribution in Polynesia is due to oceanic currents carrying its fruit from island to island. It is a composite or multiple pulpy fruit, containing a number of very hard one-seeded pyrenes. Jouan states that it is found "*sur toutes les îles du Grand-Océan entre les tropiques, le plus souvent au bord de la mer et sur les flancs des côteaux peu élevés;*" and there are specimens from a large number of the islands in the Kew Herbarium. Mann indicates it as a plant probably introduced by the aborigines in the Sandwich Islands; and this view is supported by the fact that it is known, according to Jouan, by the same name, "Noni," in the Marquesas and the Sandwich Islands, and by the very similar name "Nono" in Tahiti. It bears the name of "Kura" in the Fijis. An allied species, *Morinda forsteri*, Seem., ranges through the South Pacific Islands from the Fijis to Pitcairn Island. Genus generally spread over the tropics.

Morinda bracteata, Roxb.

Morinda bracteata, Roxb.; Miq., Fl. Ind. Bat., ii. p. 243; Hook. f., Fl. Brit. Ind., iii. p. 156 (var. *Morindæ citrifoliæ*).

Ki; Timor Laut.—This species is common wild, and is cultivated in various parts of India and Ceylon, and throughout the Archipelago, but it has not been found in Australia.

Psychotria spp.

Arrou; Ki; Timor Laut.—Of this vast genus (about 500 species are known), four or five species were collected; but the specimens were not identified with described species, and they are insufficient for determination or description.

COMPOSITÆ.

Vernonia cinerea, Less.

Vernonia cinerea, Less.; Benth., Fl. Austr., iii. p. 459; Miq., Fl. Ind. Bat., ii. p. 11; Hook. f., Fl. Brit. Ind., iii. p. 233; Oliver, Fl. Trop. Afr., iii. p. 275.
Vernonia diffusa, Dcne., Herb. Timor. Descr., p. 80, *non* Less.
Vernonia erigeroides, DC., Prodr., v. p. 25; Miq., Fl. Ind. Bat., ii. p. 13.

Arrou; Timor Laut; Babar; Wetter.—Generally spread in the tropical regions of the Old World. An exceedingly variable plant, and a somewhat anomalous species of the genus, which comprises about 400 species spread nearly all over the tropics, though only the present species has been found in Australia. The original *Vernonia diffusa*, Dcne., is a very distinct form, but we follow Bentham in reducing it to *Vernonia cinerea*.

Vernonia chinensis, Less.

Vernonia chinensis, Less.; Miq., Fl. Ind. Bat., ii. p. 18; Hook. f., Fl. Brit. Ind., iii. p. 235.
Cyanopis pubescens, DC., Prodr., v. p. 69.

Timor Laut.—This species ranges from Pegu, China, and the Philippines through the Malayan Archipelago. It is also recorded from the Marianne Islands.

Adenostemma viscosum, Forst. var.

Adenostemma viscosum, Forst. var.; Miq., Fl. Ind. Bat., ii. p. 23; Benth., Fl. Austr., iii. p. 462; Hook. f., Fl. Brit. Ind., iii. p. 242; Seem., Fl. Vit., p. 140.

Arrou; Ki.—This annual herb is almost everywhere in warm countries, but especially abundant in the Old World. It is very variable, and should, according to Bentham, include all the Old World forms of the genus published as species by De Candolle.

Ageratum conyzoides, Linn.

Ageratum conyzoides, Linn.; Benth., Fl. Austr., iii. p. 462; Miq., Fl. Ind. Bat., ii. p. 23; Hook. f., Fl. Brit. Ind., iii. p. 243; Seem., Fl. Vit., p. 140.

Arrou.—Also an annual, and common throughout the tropics, including many of the Polynesian Islands; yet probably of American origin, as are all the other species of the genus.

Blumea laciniata, DC.

Blumea laciniata, DC.; Hook. f., Fl. Brit. Ind., iii. p. 264.
Conyza runcinata, Wall.; Miq., Fl. Ind. Bat., ii. p. 46.
Blumea runcinata, DC., et *Blumea sonchifolia*, DC., Prodr., v. p. 436.

Letti.—Throughout India, the warmer parts of China, the Philippines, and the Archipelago. *Blumea* comprises upwards of sixty species, spread over the warmer parts of Asia, Africa, and Australia.

Blumea lacera, DC. var.

Blumea lacera, DC. var.; Benth., Fl. Austr., iii. p. 526; Hook. f., Fl. Brit. Ind., iii. p. 263; Oliver, Fl. Trop. Afr., iii. p. 322.
Conyza lacera, Burm.; Miq., Fl. Ind. Bat., ii. p. 42.

Timor Laut; Babar.—Almost universal in the tropics of the Old World.

Blumea membranacea, DC.

Blumea membranacea, DC.; Hook. f., Fl. Brit. Ind., iii. p. 265.
Conyza membranacea, Wall.; Miq., Fl. Ind. Bat., ii. p. 49.

Timor Laut.—A variable plant, common throughout India and the Archipelago.

Blumea balsamifera, DC.

Blumea balsamifera, DC.; Hook. f., Fl. Brit. Ind., iii. p. 270.
Conyza balsamifera, Linn., et *Conyza appendiculata*, Blume; Miq., Fl. Ind. Bat., ii. pp. 55 et 56.

Maru; Babar.—Widely dispersed in Tropical Asia.

Blumea wightiana, DC.

Blumea wightiana, DC.; Hook. f., Fl. Brit. Ind., iii. p. 261; Oliver, Fl. Trop. Afr., iii. p. 323 (sub *Blumea lacera*).
Conyza lactucæfolia, Wall.; Miq., Fl. Ind. Bat., ii. p. 48.

Babar.—Common in Tropical Asia and Tropical Africa, and also occurring in Australia, according to Hooker, though it is not included in Bentham's Flora Australiensis.

Pluchea indica, Less.

Pluchea indica, Less.; Benth., Fl. Austr., iii. p. 527; Hook. f., Fl. Brit. Ind., iii. p. 272.
Conyza indica, Blume; Miq., Fl. Ind. Bat., ii. p. 58.

Timor Laut.—A salt-marsh plant, ranging from China and the Sunderbunds, in India, to North Australia. The genus *Pluchea* comprises about thirty species spread over the warmer parts of Asia, Africa, America, and Australia.

Wedelia biflora, DC.

Wedelia biflora, DC.; Benth., Fl. Austr., iii. p. 539; Hook. f., Fl. Brit. Ind., iii. p. 306; Oliver, Fl. Trop. Afr., iii. p. 376.
Wollastonia biflora, DC., et *Wollastonia scabriuscula*, DC.; Miq., Fl. Ind. Bat., ii. pp. 70 et 71.

Moa; Timor Laut.—A common seaside plant in the tropical regions of the Old World. De Candolle records it from the Marianne Islands. There are between forty and fifty species of *Wedelia*, mostly American.

Bidens pilosa, Linn.

Bidens pilosa, Linn.; Benth., Fl. Austr., iii. p. 543; Miq., Fl. Ind. Bat., ii. p. 76; Hook. f., Fl. Brit. Ind., iii. p. 309; Seem., Fl. Vit., p. 143.

ARROU; TIMOR LAUT.—Generally spread in warm countries, including many of the islands of Polynesia. *Bidens bipinnata*, Linn., reduced by Hooker to a variety of the present species, also occurs in Timor Laut. *Bidens* is a considerable genus, and the species are spread over all tropical, and nearly all temperate regions.

Emilia sonchifolia, DC.

Emilia sonchifolia, DC.; Miq., Fl. Ind. Bat., ii. p. 101; Hook. f., Fl. Brit. Ind., iii. p. 336; Oliver, Fl. Trop. Afr., iii. p. 405.

TIMOR LAUT.—Common throughout India, "but no specimen seen from the Malay Peninsula" (Hooker); also in Tropical Africa, and in America, where it is probably a colonist. There are three or four other species of the genus which are all in Tropical Asia, and one extends to Australia.

GOODENOVIEÆ.

Scævola kœnigii, Vahl.

Scævola kœnigii, Vahl; Benth., Fl. Austr., iv. p. 86; Miq., Fl. Ind. Bat., ii. p. 580, *pro parte*; Hook. f., Fl. Brit. Ind., iii. p. 421; Seem., Fl. Vit., p. 145; Nadeaud, Enum. Pl. Tahiti, p. 50.

ARROU; TIMOR LAUT; LETTI; LAKOR.—A maritime shrub, common on the shores of Tropical Asia, North Australia, and Polynesia. Nadeaud, however, states that it did not exist in Tahiti in his time, and Mann does not include this species in his enumeration of the plants of the Sandwich Islands (Proceedings of the American Academy of Arts and Sciences, vii. p. 187); but Seemann records it from the Sandwich Islands, and, if we include *Scævola sericea*, Forst., which is probably only a hairy state of *Scævola kœnigii*, and a parallel instance of what occurs in the West Indian maritime genus *Borrichia* (see Part I., p. 45), it is plentiful there.

The genus *Scævola* comprises about sixty species, whereof fifty occur in Australia, where forty-nine of them are endemic. A few species are restricted to Polynesia, chiefly to the Sandwich Islands; and there is one species, *Scævola lobelia*, Linn., which is common on the sea-shores of Tropical Asia, Africa, and America, and also occurs in the Galapagos, and in the Bermudas, but neither in Australia nor in Polynesia.

PLUMBAGINEÆ.

Ægialitis annulata, R. Br.

Ægialitis annulata, R. Br.; Benth., Fl. Austr., iv. p. 266; Miq., Fl. Ind. Bat., ii. p. 995.

ARROU.—A shrub of remarkably different aspect from all the other members of the order, inhabiting mangrove swamps in Timor and North-eastern Australia. There is a

second species or variety, which grows in similar situations in Bengal and the Malayan Peninsula.

Plumbago zeylanica, Linn.

Plumbago zeylanica, Linn.; Benth., Fl. Austr., iv. p. 267; Miq., Fl. Ind. Bat., ii. p. 994; Hook. f., Fl. Brit. Ind., iii. p. 480; Seem., Fl. Vit., p. 194; Nadeaud, Enum. Pl. Tahiti, p. 48; Mann in Proc. Amer. Acad., vii. p. 189.

Ki; Tenimber; Letti.—This plant is now generally spread in Tropical Asia, Africa, and Australia, and in some of the Polynesian Islands; but as it is very commonly cultivated for ornament, its range may have considerably widened by this means. Nadeaud cites a Tahitian name for it; and Mann states that the acrid juice is used by the natives of the Sandwich Islands for tattooing. There are about ten species of the genus, spread over the warmer parts of both hemispheres, and extending to the Cape of Good Hope in the south, and Southern Europe and Central Asia in the north. *Plumbago scandens* is almost everywhere in the warmer parts of America.

MYRSINEÆ.

Mæsa nemoralis, A. DC. ?

Mæsa nemoralis, A. DC. ? Prodr., viii. p. 79; Seem., Fl. Vit., pp. 148 et 430.

Timor Laut; Babar.—The true *Mæsa nemoralis* has been collected in New Caledonia, the New Hebrides, the Tongan Islands, and the Solomon and Samoan groups.

Imperfect specimens of several other species were collected in Timor Laut.

SAPOTACEÆ.

Mimusops kauki, Linn.

Mimusops kauki, Linn.; Hook. f., Fl. Brit. Ind., iii. p. 549; Miq., Fl. Ind. Bat., ii. p. 1042.

Timor Laut.—The Malayan Peninsula and Archipelago, and also in Tropical Australia, if *Mimusops browniana*, Benth. (Fl. Austr., iv. p. 285), be regarded as the same species. Genus widely spread in warm regions.

EBENACEÆ.

Diospyros maritima, Blume.

Diospyros maritima, Blume, Hiern. Ebenaceæ, p. 211.
Cargillia laxa, R. Br., Prodr. Fl. N. Holl., p. 526; Benth., Fl. Austr., iv. p. 287.
Cargillia maritima, Hassk., Cat. Pl. Hort. Bot. Bogor., ii. p. 159; Miq., Fl. Ind. Bat., ii. p. 1049.

Ki; Larat; Timor Laut; Moa.—A sea-coast tree, ranging from Java to Timor and North Australia.

There are imperfect specimens of another species in Mr Moseley's Arrou collection. The genus *Diospyros* comprises upwards of 150 species spread over all tropical countries, and a few extending into north temperate regions in Japan, South Europe, and North America.

OLEACEÆ.

Jasminum sambac, Ait.

Jasminum sambac, Ait.; Miq., Fl. Ind. Bat., ii. p. 542; Hook. f., Fl. Brit. Ind., iii. p. 591.

ARROU.—Widely dispersed in Tropical Asia, where, however, as elsewhere in the tropics, it is commonly cultivated. There are nearly a hundred species of the genus, spread over the warmer parts of the Old World; one species reaching the south of Europe.

Jasminum didymum, Forst.

Jasminum didymum, Forst.; Benth., Fl. Austr., iv. p. 294; Seem., Fl. Vit., p. 154; Nadeaud, Enum. Pl. Tahiti, p. 55.
Jasminum parviflorum, Dcne., Herb. Timor. Descr., p. 77; Miq., Fl. Ind. Bat., ii. p. 531.

TIMOR LAUT.—Java to Northern Australia; also in New Caledonia, Tahiti, and the Fijis.

Jasminum lancifolium, Dcne. ?

Jasminum lancifolium, Dcne. ? Herb. Timor. Descr., p. 76; Miq., Fl. Ind. Bat., ii. p. 539.

KI.—Only seen elsewhere from Timor.

Linociera ramiflora, DC.

Linociera ramiflora, DC., Prodr., viii. p. 297.
Chionanthus ramiflora, Roxb., Fl. Ind., i. p. 107; Benth., Fl. Austr., iv. p. 301; Miq., Fl. Ind. Bat., ii. p. 551.

KI.—Tenasserim and the Philippines, to North-east Australia. Clarke (in Hook. f., Fl. Brit. Ind., iii. p. 611) makes this a variety of *Linociera macrophylla*, Wall., thus extending its range northward to the Himalayas. *Linociera* numbers nearly forty species, inhabiting the tropical regions of both hemispheres.

APOCYNACEÆ.

Rauwolfia amsoniæfolia, A. DC.

Rauwolfia amsoniæfolia, A. DC., Prodr., viii. p. 338.

KI; TIMOR LAUT; MARU.—Philippines, and probably some of the intermediate islands. *Rauwolfia* numbers nearly forty species, which inhabit Tropical America, Asia, Africa, and South Africa.

Cerbera odollam, Gærtn.

Cerbera odollam, Gærtn.; Benth., Fl. Austr., iv. p. 306; Miq., Fl. Ind. Bat., ii. p. 413; Hook. f., Fl. Brit. Ind., iii. p. 638.
Cerbera lactaria, Hamilt.; Seem., Fl. Vit., p. 638.

Arrou; Ki; Moa; Dia.—A small tree inhabiting the coast region and salt-marshes of Tropical Asia, Australia, and many of the islands of Polynesia, including the New Hebrides, the Tongan and Fiji Islands, and the Isle of Pines, near New Caledonia. The large fibrous seed-vessel of this and the three or four other species of the genus, which are also sea-shore trees, floats on the water, and is diffused by oceanic currents. It is in the collection of drift fruits and seeds made by Mr Moseley.

Ochrosia borbonica, Gmel. ?

Ochrosia borbonica, Gmel. ? Hook. f., Fl. Brit. Ind., iii. p. 638.

Arrou.—Imperfect specimens of an *Ochrosia*, probably of this species, which inhabits the tidal forests of the Andaman Islands, Singapore, Java, Ceylon, the Seychelles and Mascarene Islands. Another species was collected in Timor Laut, perhaps the Australian *Ochrosia elliptica*, Labill. There are about a dozen species in the region indicated, some of them extending to the Pacific Islands. Darwin collected one species, *Ochrosia parviflora*, Henslow, in the Keeling Islands, and the same one has since been found in Tahiti, the Ellice, Samoan, and Fiji groups.

Plumeria acutifolia, Poir.

Plumeria acutifolia, Poir.; Miq., Fl. Ind. Bat., ii. p. 426; Hook. f., Fl. Brit. Ind., iii. p. 641.

Ki.—A tree of American origin, now commonly cultivated and widely naturalised in India and the Archipelago. The genus, which numbers from thirty to forty species, is wholly American, though several species are now colonised in the Old World.

Tabernæmontana parviflora, Dene.

Tabernæmontana parviflora, Dene., Herb. Timor. Descr., p. 51.
Tabernæmontana decaisnei, DC., Prodr., viii. p. 369; Miq., Fl. Ind. Bat., ii. p. 420.

Ki; Lakor; Timor Laut; Dammar; Moa; Letti; Babar.—Bentham (Fl. Austr., iv. p. 311) regards this as a form of *Tabernæmontana orientalis*. There are upwards of 100 species of this genus, spread over the warmer regions of both hemispheres.

Tabernæmontana orientalis, R. Br. var.

Tabernæmontana orientalis, R. Br. var.; Benth., Fl. Austr., iv. p. 311; Seem., Fl. Vit., p. 159, excl. syn. *Tabernæmontana cumingiana*, DC., *fide* Benth.

Timor Laut.—A sea-coast tree or shrub found on the shores of New South Wales, Queensland, North Australia, the Fijis, and other Pacific Islands.

Tabernæmontana floribunda, Blume ?

Tabernæmontana floribunda, Blume ?; Miq., Fl. Ind. Bat., ii. p. 421.

Arrou; Ki.—Miquel only records this species from the mountainous parts of Java.

Alstonia spectabilis, R. Br. ?

Alstonia spectabilis, R. Br. ? Miq., Fl. Ind. Bat., ii. p. 437; Dene., Herb. Timor. Descr., p. 50.

Timor Laut.—Founded on Timor specimens. A fragment of another species was collected in Ki, and a second species, probably *Alstonia macrophylla*, in Timor Laut. The latter ranges from Penang and the Philippines to Timor. *Alstonia* is restricted to Tropical Asia and Australia, and the Pacific Islands; about thirty species being known.

Lyonsia sp. ?

Arrou; Timor Laut.—About twelve other species of *Lyonsia* are known, ten of them being restricted to Australia; one is endemic in the Fijis, and one in New Caledonia.

Parsonsia spiralis, Wall.

Parsonsia spiralis, Wall.; Hook. f., Fl. Brit. Ind., iii. p. 650.
Heligme javanica, Blume; Miq., Fl. Ind. Bat., ii. p. 429.
Heligme rheedii, Wight, Ic. Pl. Ind. Or., t. 1303; Rheede, Hort. Malab., ix. t. 10.
Spirostemon spiralis, Griff., Notul., iv. p. 80, et Ic. Pl., t. 411, fig. 1.
Aganosma concanensis, Hook., Ic. Pl., t. 841.

Arrou; Babar.—A twining shrub, common from Silhet and China to Singapore, and occurring in many of the islands of the Archipelago; also in the Indian Peninsula from Concan southward, and Ceylon. Wallich gave names to four Indian forms which are all treated as one species, without even varietal rank, in the Flora of British India. There are about ten other species of the genus inhabiting Australia, New Caledonia, and New Zealand. *Parsonsia* is the only genus of the order represented in the last-named country, where there are two species.

Wrightia calycina, A. DC. ?

Wrightia calycina, A. DC. ? Miq., Fl. Ind. Bat., ii. p. 433.

Timor Laut.—This species appears to be restricted to the Archipelago. Miquel includes *Wrightia tinctoria*, Dene. (Herb. Timor. Descr., p. 51), but not of R. Brown, in it. The genus ranges from Australia to the Himalayas.

Anodendron paniculatum, A. DC.

Anodendron paniculatum, A. DC. ? Miq., Fl. Ind. Bat., ii. p. 454; Hook. f., Fl. Brit. Ind., iii. p. 668; Wight, Ic. Pl. Ind. Or., t. 1309; Rheede, Hort. Malab., ix., t. 8.

Moa.—This gigantic climber ranges from Concan to Ceylon and Silhet, and the Philippines to Timor. *Anodendron* is a small genus restricted to Tropical Asia.

ASCLEPIADEÆ.

Calotropis gigantea, R. Br.

Calotropis gigantea, R. Br.; Hook. f., Fl. Brit. Ind., iv. p. 17; Miq., Fl. Ind. Bat., ii. p. 481; Rumph., Herb. Amb., vii. p. 24, t. 14, fig. 1.

Lakor; Timor Laut; Letti.—Common throughout India, from the Punjab to Assam, Ceylon, and Singapore; also in South China and in the Archipelago; but hitherto not found in Australia. The root and leaves are used medicinally in Java, according to Miquel. There are two other species of the genus, which is confined to the warmer parts of Asia and Africa.

Asclepias curassavica, Linn.

Asclepias curassavica, Linn.; Benth., Fl. Austr., iv. p. 326; Hook. f., Fl. Brit. Ind., iv. p. 18; Miq., Fl. Ind. Bat., ii. p. 485; Seem., Fl. Vit., p. 161.

Arrou; Ki.—An herbaceous plant, native of the West Indies, and now spread all over the tropics, partly dispersed as a weed of cultivation, but doubtless greatly extended by means of its comose seed. *Asclepias* is a considerable genus, but the great bulk of the species are concentrated in Mexico and Temperate North America. A few occur in South America, and two at least in Africa.

Marsdenia spp.

Timor Laut; Wetter.—The genus *Marsdenia* is widely diffused in the tropics of both hemispheres, and imperfect specimens of two or three species have been collected in the Eastern Moluccas.

Hoya spp.

Arrou; Timor Laut; Babar.—Fragments of several species belonging apparently to this large tropical Asian and Australian genus are in the collections, but they have not been matched with described species, and they are too imperfect for description.

Dischidia n. sp. ?

Timor Laut.—This remarkable genus consists of about twenty-four species, generally dispersed in the tropical parts of Eastern India and the Archipelago; one common Indian species (*Dischidia nummularia*, R. Br.) ranging southward to North Australia.

Ceropegia horsfieldiana, Miq.

Ceropegia horsfieldiana, Miq., Fl. Ind. Bat., ii. p. 528.
Ceropegia curviflora, Hassk. in Bot. Zeit., 1847.

Timor Laut.—Java. Bentham (Fl. Austr., iv. p. 348) refers the *Ceropegia cumingiana* (Bot. Mag. t. 4349) to this species; the true *Ceropegia cumingiana*

inhabits the Philippines and Queensland, Australia, where it is the only species of a genus numerous in India and Africa. There are about fifty species of *Ceropegia* spread over the warmer parts of the Old World.

LOGANIACEÆ.

Gærtnera sp.

ARROU.—*Gærtnera* is a genus of about twenty-five species, inhabiting Tropical Asia and Africa, but rare in the Archipelago, and not known to be represented in Australia. The present plant may be the common *Gærtnera kœnigii*, Wight, Ic. Pl. Ind. Or., t. 1318.

BORAGINEÆ.

Cordia subcordata, Lam.

Cordia subcordata, Lam.; Benth., Fl. Austr., iv. p. 385; Hook. f., Fl. Brit. Ind., iv. p. 140; Miq., Fl. Ind. Bat., ii. p. 914; Seem., Fl. Vit., p. 168, t. 34; Nadeaud, Enum. Pl. Tahiti, p. 57 Mann. in Proc. Amer. Acad., vii. p. 194.
Cordia sebestena, Forst., Fl. Ins. Austr. Prodr., p. 18, non Linn.
Cordia rumphii, Blume, Bijdr., p. 843; Rumph., Herb. Amb., ii. p. 226, t. 75.

LAKOR; TIMOR LAUT.—A very common tree in Polynesia, from the Fijis to the Sandwich Islands, and among others in the Marquesas and Society groups. It is most likely the "*Cordia sebestena*, Linn., *an potius Cordia speciosa*, Willd." of Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 116), who states that it is usually found on the sea-shore, and expresses the opinion that the seeds are conveyed from place to place by oceanic currents. Seemann mentions that the seeds are eaten by the natives [of Fiji?], though there is not much taste in them. Nadeaud describes this as a tree of the madreporic vegetation, met with on the sea-shore, and adds that it furnishes the beautiful red dye of Tahiti. This tree is also common in the islands of the Indian Ocean, and westward to the east coast of Africa. In India it is commonly planted, and perhaps nowhere really wild; it is also found throughout the Archipelago, and on the coast of Tropical Australia. The genus *Cordia* numbers nearly 200 species, spread over the warmer regions of both hemispheres, but most numerous in America.

Ehretia sp.

ARROU; LETTI.—*Ehretia* is a considerable genus, widely dispersed in the tropical regions of the Old World.

Tournefortia argentea, Linn. f.

Tournefortia argentea, Linn. f.; Benth., Fl. Austr., iv. p. 389; Miq., Fl. Ind. Bat., ii. p. 926; Hook. f., Fl. Brit. Ind., iv. p. 145; Seem., Fl. Vit., p. 171; Nadeaud, Enum. Pl. Tahiti, p. 57.

ARROU to TIMOR LAUT.—A common seaside shrub on nearly all coasts, insular and continental, of the Indian and Pacific Oceans, at least in the warmer parts. Seemann records

it as common on the sea-beach of nearly all the Fiji Islands; and its area embraces the Society and Marianne Islands. Nadeaud says it is a common shrub on most coral islands; but that it had become very rare in Tahiti, where it is destined to be extirpated. There are specimens in the Kew Herbarium from Ducie Island, collected by Cuming and J. T. Arundel; the latter says: "The commonest thing on all these low islands, generally growing by the sea, and sometimes quite large." There are also specimens from the Ellice, Union, and Gilbert groups, collected by the Revs. J. Whitmee and T. Powell, with memoranda to the effect that it is one of the characteristic features of the vegetation; and from several small islands in the Indian Ocean, as Bird, Cerf, and Poivre Islands. Several other species of the genus are littoral in tropical and subtropical regions, both in America and the Old World.

Tournefortia sarmentosa, Lam.

Tournefortia sarmentosa, Lam.; Benth., Fl. Austr., iv. p. 390; Miq., Fl. Ind. Bat., ii. p. 927; Dcne., Herb. Timor. Descr., p. 66.

Arrou; Ki; Timor Laut.—This species ranges from the Philippines to North Australia; it also occurs in the Mauritius and Seychelles, but does not appear to extend to Polynesia.

Heliotropium indicum, Linn.

Heliotropium indicum, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 152; Griseb., Fl. Brit. W. Ind., p. 485; F. Muell., Syst. Census Austr. Pl., p. 100.
Heliophytum indicum, DC.; Miq., Fl. Ind. Bat., ii. p. 925.

Letti.—An annual, now almost everywhere in the tropics. *Heliotropium* is a genus of more than 100 species, which are generally diffused in the warmer regions of both hemispheres, and extend into some temperate regions.

CONVOLVULACEÆ.

Ipomœa angustifolia, Jacq.

Ipomœa angustifolia, Jacq., Ic. Pl. Rar., t. 317, not of Choisy; Benth., Fl. Austr., iv. p. 425; Hook. f., Fl. Brit. Ind., iv. p. 205.
Ipomœa filicaulis, Blume; Miq., Fl. Ind. Bat., ii. p. 603.

Timor Laut.—An annual species widely dispersed in Tropical Asia, Africa, and Australia. Miquel records it from the "tropische gewesten der geheele aarde," but we have seen no American specimen.

As now usually limited, *Ipomœa* numbers between 300 and 400 species, generally diffused in warm regions, but very rare or quite absent in temperate and cold countries.

Ipomœa vitifolia, Sweet.

Ipomœa vitifolia, Sweet; Miq., Fl. Ind. Bat., ii. p. 607; Hook. f., Fl. Brit. Ind., iv. p. 213.

Timor Laut.—Throughout India, except the dry north-west, from Sikkim, Assam, Chittagong, and Burmah, southward to Ceylon and Malacca, and the Archipelago.

Ipomœa hederacea, Jacq.

Ipomœa hederacea, Jacq.; Benth., Fl. Austr., iv. p. 416; Hook. f., Fl. Brit. Ind., iv. p. 199; Hemsl. in Godm. et Salv. Biol. Centr.-Am., ii. p. 387.
Pharbitis nil et *Pharbitis hederacea*, Choisy in DC. Prodr., ix. pp. 343, 344; Miq., Fl. Ind. Bat., ii. pp. 595, 596.

Timor Laut.—Now generally dispersed in tropical and some subtropical regions, where, however, it is also widely cultivated for its ornamental character.

Ipomœa turpethum, R. Br.

Ipomœa turpethum, R. Br.; Benth., Fl. Austr., iv. p. 418; Hook. f., Fl. Brit. Ind., iv. p. 212; Miq., Fl. Ind. Bat., ii. p. 606; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58.

Timor Laut.—Generally dispersed from the Himalayas and Formosa, through the islands of the Indian Ocean, the Indian Archipelago, to North Australia, and many of the Pacific Islands. It seems to flourish equally well inland and on the sea-shore.

Ipomœa glaberrima, Bojer.

Ipomœa glaberrima, Bojer in Hook. Journ. Bot., i. p. 357; Baker, Fl. Maurit., p. 211.
Calonyction comosperma, Bojer, Hort. Maurit., p. 228; DC., Prodr., ix. p. 346; Seem., Fl. Vit., p. 171.

Timor Laut.—This species inhabits Eastern Africa, Madagascar, the Seychelles, and the Fiji and other islands, often growing on the sea-shore.

Ipomœa cymosa, Rœm. et Schult.

Ipomœa cymosa, Rœm. et Schult.; Benth., Fl. Austr., iv. p. 423; Miq., Fl. Ind. Bat., ii. p. 613; Hook. f., Fl. Brit. Ind., iv. p. 211; Baker, Fl. Maurit., p. 208; Rumph., Herb. Amb., v. t. 158.

Timor Laut.—Generally dispersed in Tropical Asia, and extending to Africa and North Australia, including many of the intervening islands. It is recorded as being common in Mahé, Seychelles, both near the shore and on the tableland.

Ipomœa biloba, Forsk.

Ipomœa biloba, Forsk., Fl. Æg.-Arab., p. 44; Clarke in Hook. f., Fl. Brit. Ind., iv. p. 212.
Ipomœa pes-caprœ, Sweet; Benth., Fl. Austr., iv. p. 419; Miq., Fl. Ind. Bat., ii. p. 602; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 116, 136, et 148; Mann in Proc. Amer. Acad., vii. p. 195.

Arrou; Lakor.—This plant grows almost everywhere on sandy coasts in tropical and subtropical regions, binding the sands with its strongly developed root-system. Jouan states that it is one of the first plants to invade the corals islets, and that its seeds are impervious to the action of sea-water. See Part II., p. 80.

Hewittia bicolor, Wight.

Hewittia bicolor, Wight; Hook. f., Fl. Brit. Ind., iv. p. 216; Miq., Fl. Ind. Bat., ii. p. 620.
Ipomœa timorensis, Blume, Bijdr., p. 711.

Timor Laut.—This perennial herb ranges from Assam and the Philippines to Timor, and it is common in Tropical and South Africa, but it does not appear to reach the South Pacific Islands, nor Australia, nor the Mascarene Islands. *Hewittia* is a monotypic genus.

Convolvulus parviflorus, Vahl.

Convolvulus parviflorus, Vahl; Miq., Fl. Ind. Bat., ii. p. 622; Benth., Fl. Austr., iv. p. 430; Hook. f., Fl. Brit. Ind., iv. p. 220.

Timor Laut.—Widely dispersed in Tropical Asia, and extending to Australia. It is also recorded from Tropical Africa in the Flora of British India, but we have seen no specimens from that country. The species of *Convolvulus*, of which there are nearly 150, mostly inhabit temperate and subtropical regions, and they are especially numerous in the Mediterranean region.

Cuscuta reflexa, Roxb. var.?

Cuscuta reflexa, Roxb. var.? Hook. f., Fl. Brit. Ind., iv. p. 225; Miq., Fl. Ind. Bat., ii. p. 631; Dcne., Herb. Timor. Descr., p. 66.

Wetter.—The true *Cuscuta reflexa* is common throughout India, from the sea-level to an altitude of 8000 feet, and it is also found in Timor. There are about eighty species of *Cuscuta* known, and they are very generally diffused in tropical and temperate regions, including New Zealand, where there is one endemic species.

SOLANACEÆ.

Lycopersicum esculentum, Mill.

Lycopersicum esculentum, Mill.; Miq., Fl. Ind. Bat., ii. p. 635; Rumph., Herb. Amb., v. t. 154.

Arrou; Maru; Timor Laut.—The Tomato, a native of America, is now naturalised in many other tropical countries.

Solanum indicum, Linn.

Solanum indicum, Linn.; Miq., Fl. Ind. Bat., ii. p. 651; Hook. f., Fl. Brit. Ind., iv. p. 234.

Ki.—Common throughout Tropical India, and extending to China and the Philippines, and southward to the Eastern Moluccas. Miquel also records it from Australia, but it is not included in Bentham's Flora Australiensis. *Solanum* is one of the largest genera of plants, numbering, according to a very moderate estimate, at least 700 species. They are mostly inhabitants of tropical regions, though a few species extend to both north and south temperate countries.

Solanum verbascifolium, Linn.

Solanum verbascifolium, Linn.; Miq., Fl. Ind. Bat., ii. p. 640; Hook. f., Fl. Brit. Ind., iv. p. 230; Benth., Fl. Austr., iv. p. 449; Griseb., Fl. Brit. W. Ind., p. 438.

Ki; Timor Laut.—Widely dispersed in Tropical Asia and America; also found in Eastern Tropical Australia, but not recorded from Africa.

Solanum torvum, Swartz var.

Solanum torvum, Swartz var.; Miq., Fl. Ind. Bat., ii. p. 648; Hook. f., Fl. Brit. Ind., iv. [p. 234; Griseb., Fl. Brit. W. Ind., p. 441.

Timor Laut.—This species is widely dispersed in Tropical Asia and America, but not known to us either from Africa or Australia.

Physalis minima, Linn.

Physalis minima, Linn.; Hook. f., Fl. Brit. Ind., p. 238; Miq., Fl. Ind. Bat., ii. p. 664; Benth., Fl. Austr., iv. p. 466.

Ki; Timor Laut.—An annual herb, spread nearly all over the tropics. The genus is essentially American, and especially numerous in the Mexican region. Altogether, there are from thirty to forty species, several of which, besides *Physalis minima*, are now widely diffused in the Old World.

Capsicum frutescens, Linn.

Capsicum frutescens, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 239; Miq., Fl. Ind. Bat., ii. p. 660; Seem., Fl. Vit., p. 177.

Timor Laut.—This plant, which is probably indigenous only in America, is now cultivated and naturalised in most other warm countries, as are several other species of the genus, which has, perhaps, spread from America. No species is included in Bentham's Flora Australiensis.

Datura alba, Nees.

Datura alba, Nees; Miq., Fl. Ind. Bat., ii. p. 667.
Datura fastuosa, Linn., var. *alba*, Hook. f., Fl. Brit. Ind., iv. p. 243.

Timor Laut.—Common throughout Tropical Asia, Africa, and America; but often, like most other species of the genus, existing only as a weed of cultivation.

Nicotiana tabacum, Linn.

Nicotiana tabacum, Linn.; Miq., Fl. Ind. Bat., ii. p. 671; Hook. f., Fl. Brit. Ind., iv. p. 245.

Timor Laut.—The tobacco is a native of America, but it is now cultivated and more or less naturalised in nearly all warm countries. There are between thirty and forty species of *Nicotiana*, mostly natives of America, but a few appear to be indigenous in Australia and the Pacific Islands.

SCROPHULARINEÆ.

Buchnera ramosissima, R. Br.

Buchnera ramosissima, R. Br.; Benth., Fl. Austr., iv. p. 515.
Buchnera arguta, Dcne., Herb. Timor. Descr., p. 46; Miq., Fl. Ind. Bat., ii. p. 703.

Maru.—Timor and North Australia. The genus is widely spread in Tropical Asia, Africa, America, and Australia.

BIGNONIACEÆ.

Dolichandrone rheedii, Seem.

Dolichandrone rheedii, Seem., Journ. Bot., 1870, p. 380; Hook. f., Fl. Brit. Ind., iv. p. 379.
Spathodea rheedii, Wall., et *Spathodea diepenhorstii*, Miq., Fl. Ind. Bat., ii. p. 754.

Dammar.—Malabar and Malayan Peninsula and Archipelago, to Timor. The genus numbers about a dozen species, spread over Tropical Asia, Africa, and America.

PEDALINEÆ.

Sesamum indicum, Linn.

Sesamum indicum, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 387; Miq., Fl. Ind. Bat., ii. p. 760.

Timor Laut.—This plant is cultivated, and more or less wild in most hot countries, and its home is not known with certainty, though most likely it is in some part of Asia.

Josephinia imperatricis, Vent.

Josephinia imperatricis, Vent.; Miq., Fl. Ind. Bat., ii. p. 761; Benth., Fl. Austr., iv. p. 557; Dcne., Herb. Timor. Descr., p. 76, excl. syn. *Josephinia grandiflora*.

Timor Laut; Letti; Moa.—Celebes to North Australia. This plant has a seed-vessel armed with prickles. Only two other species are described, and they are endemic in Australia.

ACANTHACEÆ.

Ruellia aruensis, S. Moore.

Ruellia aruensis, S. Moore in Journ. Bot., 1878, p. 134.

Arrou.—Hitherto only known at Kew from this island, where it was collected by Mr Moseley. *Ruellia* is one of the largest genera of the Acanthaceæ, numbering about 150 species, for the greater part American, a few being scattered over the warmer parts of the Old World.

Petalidium sp.

Ki.—A fragmentary specimen of a plant that may belong to this small Asiatic and African genus.

Hemigraphis reptans, T. And.

Hemigraphis reptans, T. And., MSS. in Herb. Kew.
Ruellia reptans, Forst., Fl. Ins. Austr. Prodr., p. 44; Seem., Fl. Vit., p. 183.

Arrou.—New Caledonia, New Hebrides, and Admiralty Islands. *Hemigraphis* comprises about twenty species, ranging from India, China, and Japan southward, through the Archipelago, but apparently not entering Australia.

Hemigraphis parabolica, Nees.

Hemigraphis parabolica, Nees; Blanco, Fl. Filip. Noviss. App., p. 153.
Ruellia parabolica, Nees in DC. Prodr., xi. p. 144; Miq., Fl. Ind. Bat., ii. p. 786.

Arrou.—Of this plant we have only seen Cuming's Luzon specimens, besides Moseley's from Arrou. Fragments of one or two other species apparently of this genus were collected in Arrou and Timor Laut.

Strobilanthes n. sp. ?

Ki.—A genus of upwards of 120 species, mostly Indian, but generally spread in Tropical Asia and Africa.

Acanthus ilicifolius, Linn.

Acanthus ilicifolius, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 481; Benth., Fl. Austr., iv. p. 548.
Dilivaria ilicifolia, Juss.; DC. Prodr., xi. p. 268; Seem., Fl. Vit., p. 183.

Arrou; Lakor; Timor Laut.—A littoral shrub, ranging from Malabar to Ceylon and Bengal, and the Philippines to Australia and New Caledonia. Both the ordinary form and the variety *integrifolia* were collected in Timor Laut and other islands. *Acanthus* is a small genus of about fourteen species, inhabiting the Mediterranean region, and the subtropical and tropical regions of the Old World only.

Barleria prionitis, Linn.

Barleria prionitis, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 482.
Prionitis hystrix et *Prionitis pubiflora*, Miq., Fl. Ind. Bat., ii. pp. 809, 810; Rheede, Hort. Malab., ix. t. 41; Rumph., Herb. Amb., vii. t. 13.

Lakor; Dammar; Larat; Timor Laut and other islands.—A prickly bush, exceedingly common in Tropical Asia and Africa, though often occurring as an introduced plant, as it is sometimes planted for a fence. *Barleria* is a large tropical genus, chiefly American, and not known to be represented in Australia.

Asystasia intrusa, Blume.

Asystasia intrusa, Blume; Hook. f., Fl. Brit. Ind., iv. p. 493.
Asystasia blumei, Nees, et *Asystasia nemorum*, Nees in DC. Prodr., xi. p. 167; Miq., Fl. Ind. Bat., ii. p. 793.

Arrou; Lakor; Dia.—Singapore and Java. The genus is exclusively Old World, and comprises about twenty species.

Eranthemum variabile, R. Br.

Eranthemum variabile, R. Br., Prodr. Fl. N. Holl., p. 477 ; Benth., Fl. Austr., iv. p. 555.

Timor Laut.—Common in Queensland and New South Wales, but this appears to be the first discovery of the species outside of Australia. The plant figured under this name in Paxton's Magazine of Botany, xiii. p. 75, is a distinct species. The genus is generally spread over the tropics.

Eranthemum album, Nees.

Eranthemum album, Nees ; Hook. f., Fl. Brit. Ind., iv. p. 498.
Eranthemum crenulatum, Wall. ; Bot. Reg., t. 879 ; DC., Prodr., xi. p. 453 ; Miq., Fl. Ind. Bat., ii. p. 836.

Arrou ; Ki ; Dammar.—Andamans, and Malayan Peninsula and Archipelago.

Lepidagathis hyalina, Nees var. ?

Lepidagathis hyalina, Nees var. ? Miq., Fl. Ind. Bat., ii. p. 815.

Timor Laut ; Dammar ; Letti.—Common in India, and extending from China through the Archipelago. About fifty species of *Lepidagathis* are known, two of which are American, and the rest Old World, chiefly Asiatic.

Lepidagathis javanica, Blume.

Lepidagathis javanica, Blume ; Miq., Fl. Ind. Bat., ii. p. 813.

Arrou ; Ki.—Java to Timor.

Justicia gendarussa, Linn.

Justicia gendarussa, Linn. f., Suppl., p. 85 ; Rumph., Herb. Amb., iv. p. 70, t. 28.
Gendarussa vulgaris, Nees in DC. Prodr., xi. p. 410 ; Miq., Fl. Ind. Bat., ii. p. 831.

Timor Laut ; Babar.—Southern India, China, Formosa, and the Philippines through the Archipelago, but not recorded from Australia. It is also found in Madagascar, the Seychelles, Bourbon, and Mauritius ; and it exists as an introduced plant in South America. *Justicia* is a genus of more than 100 species, spread over the warm regions of both hemispheres.

Graptophyllum hortense, Nees.

Graptophyllum hortense, Nees ; Wall., Pl. As. Rar., iii. p. 285 ; DC., Prodr., xi. p. 328 ; Miq., Fl. Ind. Bat., ii. p. 824 ; T. Anders. in Journ. Linn. Soc. Lond., ix. p. 523 ; Dene., Herb. Timor. Descr., p. 54 ; Rumph., Herb. Amb., iv. t. 30.
Justicia picta, Vahl, Symb., ii. p. 14 ; Bot. Reg., t. 1227 ; Bot. Mag., t. 1870.

Arrou ; Timor Laut.—This is commonly cultivated throughout Tropical Asia, as well as in other parts of the world, on account of its showy flowers, and prettily variegated

foliage. Its native country is uncertain, though doubtless somewhere in Asia. Anderson suggests that it may be indigenous in the Friendly and Fiji Islands. There are specimens of it, without variegated foliage, in the Kew Herbarium, from the former group of islands collected by Harvey, and from the latter collected by Milne; yet it is not included in Seemann's Flora Vitiensis. Milne records it as frequent on the mountains of Ovalau. Among other cultivated specimens in the Kew Herbarium are some from the West Indies, including one from Havana, from the Herbarium of Ruiz and Pavon. There are also specimens from Sierra Leone and Mauritius. The genus includes two other species, which are endemic in Australia.

Dicliptera burmanni, Nees.

Dicliptera burmanni, Nees; Miq., Fl. Ind. Bat., ii. p. 845.
Dicliptera ciliata, Dcne., Herb. Timor. Descr., p. 56, *fide* Miquelii.

Arrou; Ki; Lakor; Dammar; Letii.—China and Java to Timor. The genus is a large one, and is represented in America as well as the Old World. Two species, allied to the present one, inhabit Timor and North Australia.

Hypoestes floribunda, R. Br.

Hypoestes floribunda, R. Br., Prodr. Fl. N. Holl., p. 474; Benth., Fl. Austr., iv. p. 553 (*varietates plures*).

Timor Laut.—Common in North Australia, Queensland, and New South Wales, and very variable. Probably, as suggested by Mr Bentham, some of the Archipelago forms, described as species by Nees and others, should be referred to this. *Hypoestes* is an exclusively Old World genus, of about forty species, ranging all over Eastern Tropical Asia southward to North Australia; also the Mascarene Islands and Tropical Africa.

MYOPORINEÆ.

Myoporum acuminatum, R. Br.

Myoporum acuminatum, R. Br., Prodr. Fl. N. Holl., p. 515; Benth., Fl. Austr., v. p. 3 (*varietates plures*).

Timor Laut.—The species of *Myoporum* are mostly concentrated in Australia, with single species in New Zealand, the Sandwich Islands, the Toubouai Islands, New Caledonia, China, Japan, and the Mauritius; but, although Bentham includes the Indian Archipelago in his distribution of the genus, we have seen no specimen except the present. *Myoporum acuminatum* is one of the commoner Australian species, occurring in all the colonies, and it is closely allied to the New Caledonian *Myoporum tenuifolium*.

VERBENACEÆ.

Callicarpa cana, Linn.

Callicarpa cana, Linn.; Miq., Fl. Ind. Bat., ii. p. 885; Dcne., Herb. Timor. Descr., p. 73; Benth., Fl. Austr., v. p. 56.

Timor Laut.—A shrub ranging from the Malayan Peninsula and the Philippines to North Australia. Miquel also records it from Bourbon, whence we have seen no specimens. It is, however, commonly cultivated. Bentham refers *Callicarpa eriocolona*, Schauer, and *Callicarpa bicolor*, Juss., to this species. The genus is a large one, and generally spread in warm countries.

Callicarpa longifolia, Lam. ?

Callicarpa longifolia, Lam.? Miq., Fl. Ind. Bat., ii. p. 887; Benth., Fl. Austr., v. p. 57.

Timor Laut.—Generally spread in Tropical Asia, and extending southward to North Australia.

Callicarpa pedunculata, R. Br.

Callicarpa pedunculata, R. Br., Prodr. Fl. N. Holl., p. 513; Benth., Fl. Austr., v. p. 57; Miq., Fl. Ind. Bat., ii. p. 886 (*lanata*).

Ki.—Archipelago and Eastern Australia. The three species of *Callicarpa* here enumerated are the only ones hitherto discovered in Australia.

Clerodendron inerme, R. Br.

Clerodendron inerme, R. Br., Prodr. Fl. N. Holl., p. 511; Benth., Fl. Austr., v. p. 63; Miq., Fl. Ind. Bat., ii. p. 868; Dcne., Herb. Timor. Descr., p. 71; Rumph., Herb. Amb., v. t. 46.

Arrou; Timor Laut.—A common seaside shrub from India, the Philippines, and Marianne Islands, to Australia and New Caledonia. Seemann (Fl. Vit., p. 188) states that it is common on the sea-coast of all the Fiji Islands; and there are specimens in the Kew Herbarium from the Tongan, Samoan, Friendly, and other groups of islands in Polynesia; but Nadeaud does not include it in his list of Tahitian plants.

Clerodendron longiflorum, Dcne. var. ?

Clerodendron longiflorum, Dcne. var.? Dcne., Herb. Timor. Descr., p. 72; Miq., Fl. Ind. Bat., ii. p. 884.

Timor Laut; Letti.—The typical plant is a native of Timor, and Miquel records it from Luzon. The genus *Clerodendron* is a large one, and the species are especially numerous in the Archipelago; a few are African, and a few American. Fragments of several other species were collected in the Eastern Moluccas.

Premna integrifolia, Linn. ?

Premna integrifolia, Linn. ? Benth., Fl. Austr., v. p. 59; Miq., Fl. Ind. Bat., ii. p. 894; Dcne., Herb. Timor. Descr., p. 74.

Timor Laut.—The true *Premna integrifolia* is a common seaside shrub or tree in this region, ranging from India to North Australia. The Polynesian *Premna tahitensis*, Schauer (Seem., Fl. Vit., p. 186, t. 43), is very near this, and ranges from the Fijis to the Marquesas.

Premna obtusifolia, R. Br.

Premna obtusifolia, R. Br., Prodr. Fl. N. Holl., p. 512; Benth., Fl. Austr., v. p. 58.
Premna cyclophylla, Miq., Fl. Ind. Bat., ii. p. 899.

Larat; Wetter; Timor Laut.—Like *Premna integrifolia*, this is a littoral species, and it ranges from Java to North Australia. An imperfect specimen of another species was collected in Arrou.

Vitex trifolia, Linn.

Vitex trifolia, Linn.; Benth., Fl. Austr., v. p. 66; Miq., Fl. Ind. Bat., ii. p. 859; Dcne., Herb. Timor. Descr., p. 72; Seem., Fl. Vit., p. 190; Hook. et Arn., Bot. Beech. Voyage, p. 206, t. 47 (*ovata*, Thunb.); Rumph., Herb. Amb., iv. t. 18.

Babar; Timor Laut; Letti.—A common seaside shrub in the tropics of the Old World, and extending to many of the Polynesian Islands, including the Sandwich group; yet it is not included by Nadeaud in his Énumération des Plantes Indigènes de Tahiti, nor by Jouan in his essay on the Plants of the Pacific Islands (Mém. Soc. Sci. Nat. Cherbourg, xi.) Seemann states that it is common on the sea-beach of all the Fiji Islands. It is also in Kew Herbarium from Samoa, Tonga, New Caledonia, and the New Hebrides. Baker (Fl. Maurit., p. 256) treats it as an introduced plant in Mauritius and the Seychelles; but as it also occurs in the Comoro Islands, and on the eastern coast of Africa, it has perhaps as good a claim to be regarded as indigenous in those islands, as in many other localities. It is an exceedingly variable plant in its foliage, exhibiting forms having one, three, and five leaflets respectively. In some of its variations it is not easily distinguished from *Vitex negundo*, Linn.

Vitex negundo, Linn.

Vitex negundo, Linn.; Miq., Fl. Ind. Bat., ii. p. 860; Dcne., Herb. Timor. Descr., p. 72; Rumph., Herb. Amb., iv. t. 19.

Timor Laut; Maru; Babar.—Common throughout India, the warmer parts of China, and southward through the Archipelago, but apparently not reaching Australia. There are also specimens in the Kew Herbarium from Eastern Africa, Madagascar, and Mauritius, yet Baker (Fl. Maurit., p. 266) says that this species is not even naturalised in Mauritius. There is also a specimen in the Kew Herbarium from Samoa, named *Vitex*

negundo. However, this and some of the forms referred to *Vitex trifolia* are so much alike, that without a careful examination of all the specimens, the distribution of the two species—if two there be—cannot be accurately given. *Vitex bicolor*, Willd., is the same as *Vitex negundo*.

Vitex pubescens, Vahl.

Vitex pubescens, Vahl; Miq., Fl. Ind. Bat., ii. p. 861; Dcne., Herb. Timor. Descr., p. 73.

WETTER.—Common in Tropical India from Bengal to Ceylon, and through the Malayan Peninsula and Archipelago, but not known from Australia.

Petræovitex riedelii, Oliv.

Petræovitex riedelii, Oliv. in Hook. Ic. Pl., t. 1420.

ARROU; WETTER.—Also in Buru. A monotypic genus, as far as at present known, established on specimens recently collected in these islands.

Avicennia officinalis, Linn.

Avicennia officinalis, Linn.; Miq., Fl. Ind. Bat., ii. p. 912; Benth., Fl. Austr., v. p. 69; Baker, Fl. Maurit., p. 257.

Although there are no specimens in the Kew Herbarium of this shrub from the Eastern Moluccas eastward of Timor, it deserves to be mentioned here on account of its remarkable geographical distribution. Taking it as limited in the Flora Australiensis (that is, to include *Avicennia tomentosa*, Jacq.), it is one of the most widely diffused of littoral shrubs, inhabiting, as it does, the shores of Tropical and Subtropical Asia, Africa, America, and Australia, and extending into some temperate regions, as the Bermudas in the north, and New Zealand in the south. It is common apparently on all the coasts of Tropical Asia; on the eastern coast of Africa it ranges from the Red Sea to the Cape of Good Hope, and is also common on the western coast; in America, it is common on both the Atlantic and Pacific coasts; and it grows all round Australia, including the western side, where so very few of this class of widely dispersed plants are found. But, except New Caledonia and the Galapagos, we have no evidence that it occurs in any of the Pacific Islands. It is not mentioned by Endlicher, Seemann, Nadeaud, Jouan, Mann, or Guillemin; and there is not a single specimen in the comparatively recent and copious collections at Kew, collected by Powell, Whitmee, and others. Therefore, should it exist at all in Polynesia proper, we may assume that it is rare. This unusual distribution is not easily explained, for many of the other salt-marsh and mangrove-swamp plants with which it is associated elsewhere, abound in many of the Pacific Islands. The plant doubtfully named *Avicennia tomentosa* in Hooker and Arnott's Botany of Beechey's Voyage, p. 93, from the Sandwich Islands, is *Vitex trifolia*.

LABIATÆ.

Ocimum sanctum, Linn.

Ocimum sanctum, Linn.; Miq., Fl. Ind. Bat., ii. p. 939; Benth., Fl. Austr., v. p. 74; Dene., Herb. Timor. Descr., p. 69.

Ki; Timor Laut.—A perennial, generally diffused in Tropical Asia, where, however, it is commonly cultivated; also occurring in North Australia, and in Africa. A genus of about forty species, widely spread in tropical regions, though more numerous in Africa and Brazil than in Asia.

Ocimum basilicum, Linn.

Ocimum basilicum, Linn.; DC., Prodr., xii. p. 32; Miq., Fl. Ind. Bat., ii. p. 937.
Ocimum gratissimum, Seem., Fl. Vit., p. 191, non Linn.

Maru.—Widely diffused in Tropical Asia and Africa, as well as in Polynesia; but, like the last, commonly cultivated; and thereby, probably, its area has been considerably extended. In a manuscript note in the Kew copy of De Candolle's Prodromus, xii. p. 32, N. E. Brown says that "*Ocimum canum* is no doubt the same species as *Ocimum basilicum*, and probably the female of it, as it is not uncommon for the sexes to be separated in the Labiateæ." If this be so, the geographical area of *Ocimum basilicum* includes South America.

Plectranthus parviflorus, Willd.

Plectranthus parviflorus, Willd.; Benth., Fl. Austr., v. p. 78; Mann in Proc. Amer. Acad., vii. p. 192; Seem., Fl. Vit., p. 192.
Plectranthus australis, R. Br., et *Plectranthus graveolens*, R. Br., *fide* Benth., *loc. cit.*; Miq., Fl. Ind. Bat., ii. p. 947.

Timor Laut.—As limited by Bentham in the Flora Australiensis, this common Australian herb or undershrub also inhabits Timor, New Caledonia, and the Sandwich Islands. Genus large, and generally dispersed in the tropics of the Old World, but not represented in America.

Coleus scutellarioides, Benth.

Coleus scutellarioides, Benth. in DC. Prodr., xii. p. 73; Fl. Austr., v. p. 79; Miq., Fl. Ind. Bat., ii. p. 949.

Timor Laut.—Widely spread in the Archipelago, and extending to North Australia. Also collected in Java and Erromanga. *Coleus* consists of about fifty species, inhabiting the warmer parts of Asia and Africa; the present species only extending to Australia.

Hyptis spicigera, Lam.

Hyptis spicigera, Lam.; DC., Prodr., xii. p. 87; Miq., Fl. Ind. Bat., ii. p. 958; Griseb., Fl. Brit. W. Ind., p. 487.

Timor Laut.—The distribution of this herb is somewhat remarkable, but it probably exists only as an introduced plant in some of the localities in the Old World. Thus, it has been found in the Philippines and in Madagascar; it is widely spread in Tropical Africa, and in America it ranges from the West Indies and Panama to Brazil. Bentham, Flora Australiensis, v. p. 80, seems to regard the genus as wholly American, for he says: "A very large genus, entirely American, tropical or subtropical; a few of the species are, however, now spread over various tropical regions of the Old World, especially Africa. In De Candolle's Prodromus Bentham defines 250 species, which are mostly herbaceous or at the most shrubby, though one, *Hyptis arborea*, is a tree thirty feet high.

Anisomeles salviæfolia, R. Br.

Anisomeles salviæfolia, R. Br., Prodr. Fl. N. Holl., p. 503; Benth., Fl. Austr., v. p. 89; Miq., Fl. Ind. Bat., ii. p. 976.

Ki; Timor Laut.—Timor and the northern part of Australia, but apparently never far from the sea. In the Flora Australiensis Bentham unites *Anisomeles moschata* and *Anisomeles inodora*, R. Br., with this species. A small genus restricted to Australia and Tropical Asia.

Anisomeles ovata, R. Br.

Anisomeles ovata, R. Br.; DC., Prodr., xii. p. 455; Miq., Fl. Ind. Bat., ii. p. 975; Baker, Fl. Maurit., p. 260.

Maru.—An exceedingly common Indian plant; also ranging from China and the Philippines to Timor, but not recorded from Australia. It is naturalised in the Mauritius, and perhaps in some of the localities in Tropical Asia.

Leucas javanica, Benth.

Leucas javanica, Benth. in DC. Prodr., xii. p. 528; Miq., Fl. Ind. Bat., ii. p. 980.

Ki.—Java to Timor. *Leucas* is a large genus, generally spread over Tropical Asia and Africa. One species only, *Leucas flaccida*, which is perhaps a variety of the more widely dispersed *Leucas decemdentata*, has been found on the coast of Queensland in Australia.

Leucas decemdentata, Smith.

Leucas decemdentata, Smith; DC., Prodr. xii. p. 526; Seem., Fl. Vit., p. 192; Nadeaud, Enum. Pl. Tahiti, p. 56.

Stachys decemdentata, Forst., Ins. Austr. Prodr., p. 91.

Timor Laut.—Common in Viti and Tahiti, and recently collected in Samoa; and Milne collected it in Aneiteum in 1853. Nadeaud states that it abounds in all parts of

Tahiti, and except the very rare *Phyllostegia tahitensis*, described by him in the work cited, it was the only Tahitian Labiate known to him. We have not seen his *Phyllostegia tahitensis*, which, if correctly referred to the genus, is the only one known outside of the Sandwich Islands, where there are upwards of a dozen species.

Cymaria acuminata, Dcne.

Cymaria acuminata, Dcne., Herb. Timor Descr., p. 71; Miq., Fl. Ind. Bat., ii. p. 992 (cum *Cymaria molli*, Miq.)

Ki; Timor Laut.—Java and the Philippines to Timor. Two other species are described from Burma; and there is a fragment of what may be a fourth species from Ki.

INCOMPLETÆ.

NYCTAGINEÆ.

Mirabilis jalapa, Linn.

Mirabilis jalapa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 988; Hemsl. in Godm. et Salv. Biol. Centr.-Am. Bot., iii. p. 1.

Timor Laut.—A native of the Mexican region, now naturalised in most warm countries. The genus is peculiar to America.

Boerhaavia diffusa, Linn.

Boerhaavia diffusa, Linn.; Benth., Fl. Austr., v. p. 277; Miq., Fl. Ind. Bat., i. 1, p. 992 (*Boerhaavia glutinosa*, Vahl); Seem., Fl. Vit., p. 196; Mann in Proc. Amer. Acad., vii. p. 198; Nadeaud, Enum. Pl. Tahiti, p. 46.

Arrou.—A very common perennial herb in the warm parts of Asia, Africa, and Australia, and throughout Polynesia, especially in maritime districts. *Boerhaavia repanda*, Willd., a stouter coarser plant than *Boerhaavia diffusa*, Linn., is almost equally common in similar situations. Closely allied species are common in America.

Pisonia aculeata, Linn.

Pisonia aculeata, Linn.; Benth., Fl. Austr., v. p. 279; Miq., Fl. Ind. Bat., i. 1, p. 989 (*Pisonia villosa*, Poir.); Griseb., Fl. Brit. W. Ind., p. 70.

Timor Laut; Babar.—A spiny shrub common in maritime districts, both in the warmer parts of America and in the Old World; but generally replaced by the unarmed *Pisonia inermis*, Jacq., and one or two other species in Polynesia.

There are about sixty known species of *Pisonia*, the majority of which inhabit Tropical America; a few are indigenous in Asia, the Pacific Islands, and Australia; but hitherto only *Pisonia aculeata* has been detected in Africa. One of the Australian species is also a native of New Zealand, and some parts of Polynesia.

AMARANTACEÆ.

Deeringia celosioides, R. Br.

Deeringia celosioides, R. Br.; Benth., Fl. Austr., v. p. 209; Miq., Fl. Ind. Bat. i. 1, p. 1025.

Timor Laut; Babar; Lakor; Wetter.—India, China, the Philippine and Marianne Islands, southward to Australia and New Caledonia, but apparently not extending to Polynesia proper. *Deeringia* is a small genus restricted to the warmer parts of the Old World.

Deeringia altissima, F. Muell.

Deeringia altissima, F. Muell.; Benth., Fl. Austr., v. p. 210.

Timor Laut.—Common in maritime districts and on river banks, in Northern New South Wales, and in Queensland. There are also specimens in the Kew Herbarium of what appears to be same species from New Caledonia.

Celosia argentea, Linn.

Celosia argentea, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1028; Dene., Herb. Timor. Descr., p. 44.

Arrou; Ki.—An annual herb widely dispersed in warm countries, but most likely introduced into America. It is not recorded from Australia, and we have seen no Polynesian specimens. The genus comprises about thirty species inhabiting the warmer parts of Asia, Africa, and America.

Allmania albida, R. Br.

Allmania albida, R. Br. in Wall. Cat., n. 6981.
Chamissoa albida, Moq. in DC. Prodr., xiii. 2, p. 248.

Dammar.—Southern India, Ceylon, the Philippines, and Java, are the localities represented in the Kew Herbarium; but it is apparently uncommon. *Allmania nodiflora* is a common Archipelago plant. Altogether, there are only three or four species, and they are restricted to Tropical Asia.

Amarantus spinosus, Linn.

Amarantus spinosus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1031; Dene., Herb. Timor. Descr., p. 43; Griseb., Fl. Brit. W. Ind., p. 68.

Arrou.—This is now widely dispersed in warm regions, both in the Old World and America; but it is not included in Bentham's Flora Australiensis, and it does not appear to colonise in Polynesia. There are probably about thirty-five distinct species of *Amarantus*.

Amarantus caudatus, Linn.

Amarantus caudatus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1030.

Timor Laut; Babar.—Widely dispersed in the warmer parts of Asia, and also occurring in Tropical Africa. It is often cultivated. *Amarantus melancholicus*, Linn., is another very widely dispersed species, and a variety of it called "*tricolor*" is common in Polynesia.

Amarantus viridis, Linn.

Amarantus viridis, Linn.; Benth., Fl. Austr., v. p. 215.
Euxolus viridis, Moq.; Miq., Fl. Ind. Bat., i. 1, p. 1035.

Arrou; Ki; Timor Laut; Moa.—An annual herb, now widely dispersed in the warmer parts of Europe, Asia, Africa, America, and Australia, growing usually in cultivated ground and waste places. It is impossible to determine where it is really indigenous.

Pupalia lappacea, Moq.

Pupalia lappacea, Moq.; Miq., Fl. Ind. Bat., i. 1, p. 1046.

Timor Laut.—Generally diffused and common in Tropical Asia and Africa, but not extending to Australia nor to Polynesia. The inflorescence is provided with glochidiate prickles, to which it probably owes its wide geographical area. There are only two other species of the genus known, one of which is common to Tropical Asia and Africa, and the other is exclusively African.

Achyranthes aspera, Linn.

Achyranthes aspera, Linn.; Benth., Fl. Austr., v. p. 246; Miq., Fl. Ind. Bat., i. 1, p. 1042; Seem. Fl. Vit., p. 199; Nadeaud, Enum. Pl. Tahiti, p. 45; Griseb., Fl. Brit. W. Ind., p. 62.

Timor Laut.—An annual herb, generally diffused in Tropical and Subtropical Asia, Africa, America, Eastern Australia, and almost throughout Polynesia. *Achyranthes* is a small genus generally spread in warm regions.

Nothosærua brachiata, Wight.

Nothosærua brachiata, Wight., Ic. Pl. Ind. Or., vi. p. 1.
Ærua brachiata, Mart.; DC., Prodr., xiii. 2, p. 304.

Timor Laut.—An annual herb widely dispersed in Tropical Asia and Africa. It is the only species of the genus.

Gomphrena globosa, Linn.

Gomphrena globosa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1050; Seem., Fl. Vit., p. 199; Rumph., Herb. Amb., v. t. 100, fig. 2.

Ki.—The genus *Gomphrena* comprises about seventy species, of which fourteen inhabit Australia, and the rest the warmer regions of America. *Gomphrena globosa* is probably

indigenous in America only, though it is now very widely spread in the Old World. It is an annual, and is commonly cultivated for ornament.

Gomphrena canescens, R. Br. var. ?

Gomphrena canescens, R. Br. var. ? Benth., Fl. Austr., v. p. 253.

Timor Laut.—Typical *Gomphrena canescens* has only been found in the northernmost part of Australia.

CHENOPODIACEÆ.

Salsola kali, Linn. var.

Salsola kali, Linn. var.; Benth., Fl. Austr., v. p. 207.
Salsola australis, R. Br., Prodr. Fl. N. Holl., p. 411; Miq., Fl. Ind. Bat., i. 1, p. 102.
Salsola tragus, Dcne., Herb. Timor. Descr., p. 42, excl. syn.

Maru.—This seaside and salt-marsh herb is very widely diffused in temperate and subtropical regions, both in America and in the Old World.

Aristolochia indica, Linn. var. ?

Aristolochia indica, Linn. var. ? Benth., Fl. Austr., vi. p. 209; Miq., Fl. Ind. Bat., i. 1, p. 1066.

Timor Laut.—This species ranges from Asia to North Australia, if the form found there really belongs to *Aristolochia indica*, of which Bentham was not quite certain. The distribution of the large genus *Aristolochia* is somewhat peculiar. It is almost universal in temperate and tropical regions, yet very rare, or quite absent from some large areas. Thus no species is indigenous in Britain; and in the southern hemisphere the genus is not represented in extratropical South Africa nor in New Zealand, and only one species grows in Chili. Five species are found in Eastern Australia, but none in Western; and Duchartre, who monographed the genus for De Candolle's Prodromus, was not aware of the existence of the genus in Polynesia. Neither Seemann nor any other writer on the Flora of Polynesia includes the genus. But in 1878 Mr Horne, of the Mauritius Botanic Garden, collected fruit-bearing specimens of an *Aristolochia* in the Fiji group; and more recently the Rev. Mr Powell sent a capsule and a flower of a species gathered in Samoa. There is no record of the exact localities of these Polynesian species, nor of their relative frequency; but we may assume that they are rare or very local, otherwise earlier collectors would have met with them.

PIPERACEÆ.

Piper spp.

Larat; Timor Laut; Babar.—Imperfect specimens of three or four species of *Piper* are in the collections from the above islands. They include what may be *Piper officinarum*, C. DC. (*Chavica officinarum*, Miq.), which is common throughout the Archipelago, though it does not extend to Australia. The genus is represented in all tropical countries.

MYRISTICEÆ.

Myristica insipida, R. Br. ?

Myristica insipida, R. Br. ? DC., Prodr., xiv. p. 206; Benth., Fl. Austr., v. p. 281.

Timor Laut.—This is the only Australian species of a genus so largely developed in the Archipelago and India. In De Candolle's Prodromus (xiv. p. 187) the distribution of the genus is given as follows:—"Arbores (rarius frutices) tropicæ, in Asia meridionali frequentiores, in America australi non raræ, in insulis Africæ australis rarissimæ, in continente africano adhuc incognitæ." We are now able to extend the above range considerably. Thus, at least three species inhabit Western Tropical Africa (see Hooker, Ic. Pl., xiii., pp. 48, 49, tt. 1260–1262), three or more inhabit Polynesia (Fiji, Tonga, and Samoa), and three Central America and Mexico. There are fragments of several other species in the collection from the South-eastern Moluccas.

LAURINEÆ.

Litsea (Cylicodaphne) sp.

Dammar.—This is the only laurel in the collections, which is rather surprising, because the order abounds in the Archipelago, and a considerable number inhabit Tropical Australia.

Cassytha filiformis, Linn.

Cassytha filiformis, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 977; Benth., Fl. Austr., v. p. 311; Mann in Proc. Amer. Acad., vii. p. 199; Nadeaud, Enum. Pl. Tahiti, p. 47.

Arrou; Ki.—Bentham unites *Cassytha americana*, Nees, with this, and thus enlarged, the species is very widely diffused, chiefly in maritime districts, in Tropical Asia, Africa, America, and Australia.

Hernandia peltata, Meissn.

Hernandia peltata, Meissn.; Benth., Fl. Austr., v. p. 314; Seem., Fl. Vit., p. 204, t. 52; Baker, Fl. Maurit., p. 293; Nadeaud, Enum. Pl. Tahiti, p. 48.

Hernandia sonora, Miq., Fl. Ind. Bat., i. 1, p. 887, et Forst., Fl. Ins. Austr. Prodr., p. 65, non Linn.

Larat; Timor Laut.—Common in the Archipelago, from China, Loo Choo, and the Philippines southward; also in Polynesia from the Fiji to the Society Islands, and in the Mascarene Islands. The genus *Hernandia* consists of about eight or nine arboreous species, spread over the tropics of both hemispheres, but usually growing in maritime districts. Nadeaud, *loc. cit.*, designates *Hernandia peltata* one of the "plantes madréporiques."

Hernandia, n. sp. ?

Ki.—This is apparently an undescribed species of *Hernandia;* but flowers are wanting, as are the involucral bracts which enclose the fruit until it is ripe.

PROTEACEÆ.

Grevillea gibbosa, R. Br. (Plate LXV. F.)

Grevillea gibbosa, R. Br. in Trans. Linn. Soc. Lond., x. p. 177; Benth., Fl. Austr., v. p. 463.

Arrou.—This arboreous species inhabits the islands of the coast of Queensland, and Mr Moseley brought a single fruit of it from the above-named island. With the exception of a few species in New Caledonia, this genus, which comprises about 160 species, is restricted to Australia.

Grevillea sp.? (Plate LXV. G.)

Arrou.—There is a little doubt respecting the genus of this fruit. Dr Beccari writes that he has flowers of what he thinks may be the same from New Guinea.

LORANTHACEÆ.

Loranthus longiflorus, Desr.?

Loranthus longiflorus, Desr.? Benth., Fl. Austr., iii. p. 390.

Ki; Timor Laut.—Typical *Loranthus longiflorus* is found in India, Timor, and North-eastern Australia. Imperfect specimens of three or four other species were collected in the Eastern Moluccas. The genus *Loranthus* numbers nearly 350 species spread all over the tropics, and a few extending into temperate regions, as one in Europe, four or five in New Zealand, and ten or a dozen in Chili.

SANTALACEÆ.

Exocarpus latifolia, R. Br. var.?

Exocarpus latifolia, R. Br. var.? Benth., Fl. Austr., vi. p. 228; Miq., Fl. Ind. Bat., i. 1, p. 781.

Timor Laut.—This species ranges from the Philippines to North-eastern Australia, southward to the Tweed river and New South Wales. It includes the *Exocarpus miniata*, Zipp., *Exocarpus luzonensis*, Presl, and *Exocarpus ovata*, Schnitzl. The genus comprises about fourteen species, whereof nine, including the present, inhabit Australia, and eight of these are endemic and spread over the whole country. There is one endemic species in New Zealand, one in Norfolk Island, one in New Caledonia, one in the Sandwich Islands, and one in Madagascar. The apparent absence of the genus from the other parts of Polynesia is remarkable.

EUPHORBIACEÆ.

Euphorbia atoto, Forst.

Euphorbia atoto, Forst., Fl. Ins. Austr. Prodr., p. 36; Benth., Fl. Austr., vi. p. 46; Seem., Fl. Vit., p. 216; Nadeaud, Enum. Pl. Tahiti, p. 72.

Arrou; Ki; Timor Laut.—A seaside shrubby species inhabiting the coast of India, the

Archipelago, North Australia, and Polynesia, from New Caledonia to the Fiji, Friendly, and Society Islands. Seemann also records it from the Sandwich Islands, collected by Macrae, Nuttall, and Barclay; but we have seen no specimens thence, and it is not included in H. Mann's enumeration of Sandwich Island plants; probably the specimens referred hither by Seemann belong to the allied *Euphorbia cordata*. The genus *Euphorbia* comprises between 600 and 700 species, growing in the most diverse localities, throughout the temperate and tropical regions, and exhibiting, perhaps, a greater variety in habit and duration than is to be found in any other genus. *Euphorbia atoto* belongs to a section of shrubby species mostly inhabiting the sea-coast and especially oceanic islands. *Euphorbia buxifolia*, of the Bermudas and West Indies, and *Euphorbia origanoides*, of Ascension, belong to the same group, which is also largely represented in Polynesia. Thus *Euphorbia chamissonis* is found in the Marshall Islands, and *Euphorbia ramosissima*, in Pitcairn and Elizabeth Islands. Another, though closely allied section, is peculiar to the Galapagos and the West Indies, eight species being endemic in the former group, and one in the Bahamas. Bentham, *loc. cit.*, reduces *Euphorbia levis*, Poir. (*Euphorbia lævigata*, Vahl) to *Euphorbia atoto*. See also Miquel, Fl. Ind. Bat., i. 2, p. 419. Nadeaud, *loc. cit.*, states that *Euphorbia atoto* especially affects the coralline parts of the shores of Tahiti.

Euphorbia antiquorum, Linn.

Euphorbia antiquorum, Linn.; Boiss. in DC. Prodr., xv. 2, p. 81; Miq., Fl. Ind. Bat., i. 2, p. 418.

Timor Laut.—A shrubby species, armed with spines, and usually almost leafless, and having thick, fleshy, angular branches, resembling some Cactaceæ. A sea-shore species, ranging from India to Timor.

Euphorbia pilulifera, Linn.

Euphorbia pilulifera, Linn.; Miq., Fl. Ind. Bat., i. 2, p 420; Benth., Fl. Austr., vi. p. 51; Seem., Fl. Vit., p. 216; Mann in Proc. Amer. Acad., vii. p. 204.

Arrou; Ki.—An annual species, now generally diffused in warm regions of both hemispheres.

Phyllanthus reticulatus, Poir.

Phyllanthus reticulatus, Poir.; Müll. Arg. in DC. Prodr., xv. 2, p. 344 (*varietates*); Benth., Fl. Austr., vi. p. 101.

Anisonema eglandulosum, Dene., Herb. Timor. Descr., p. 154; Miq., Fl. Ind. Bat., i. 2, p. 375.

Babar; Wetter.—As circumscribed by Müller, *loc. cit.*, this is widely spread in Tropical Asia and Africa. It is also found in the West Indies (*Phyllanthus jamaicensis*, Griseb., Fl. Brit. W. Ind., p. 34), where, however, it is probably a colonist. The Australian locality is doubtful.

Phyllanthus niruri, Linn.

Phyllanthus niruri, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 369; Mann in Proc. Amer. Acad., vii. p. 203; Rumph., Herb. Amb., vi. t. 17.

Timor Laut.—Very widely dispersed in warm countries, though not recorded from Australia, nor included in Seemann's Flora Vitiensis. It is an annual, and its present wide area is doubtless partly due to conveyance with the seeds of cultivated plants.

Phyllanthus diversifolius, Miq. var. ?

Phyllanthus diversifolius, Miq. var.? Miq., Fl. Ind. Bat. Suppl., i. p. 448; Müll. Arg. in DC. Prodr., xv. 2, p. 297.

Timor Laut.—India and throughout the Archipelago. Fragments of several other species of this genus are before us from Arrou, Timor Laut, and other islands. Altogether there are upwards of 400 species, which are very widely dispersed in warm and temperate regions, excluding Europe and Asiatic Russia, and some other parts; and relatively rare in all temperate regions. In Polynesia, according to Seemann, *loc. cit.*, one-third of all the Euphorbiaceæ known in his time belonged to *Phyllanthus*, and he enumerates no fewer than twenty-seven from New Caledonia.

Securinega sp. ?

Timor Laut.—*Securinega* is a genus of about eight shrubby species, widely scattered in Tropical Asia, Africa, and Australia.

Breynia fruticosa, Benth. et Hook. f.

Breynia fruticosa, Benth. et Hook. f., Gen. Plant., iii. p. 277.
Melanthesopsis fruticosa, Müll. Arg. in DC. Prodr., xv. 2, p. 437.

Timor Laut.—China to Borneo, according to Müller. This genus comprises about a dozen species spread over Tropical Asia, Australia, and the South Pacific Islands.

Jatropha curcas, Linn.

Jatropha curcas, Linn.; DC., Prodr., xv. 2, p. 1080; Miq., Fl. Ind. Bat., i. 2, p. 392; Dene., Herb. Timor. Descr., p. 159; Griseb., Fl. Brit. W. Ind., p. 36; Seem., Fl. Vit., p. 230.

Maru.—A native of Tropical America commonly cultivated in other warm countries, and now widely naturalised. Miquel states that it is universally planted in Java, up to an elevation of 5000 feet; he also mentions that it was planted in Timor. Seemann records it from the Tongan Islands, and adds, that it had been introduced thence into the Fiji Islands. It is the "Physic-nut plant," and is commonly cultivated for the sake of the purgative oil afforded by its seeds. *Jatropha* numbers nearly seventy species, spread over the warmer regions of the earth, but by far most numerous in America.

Aleurites moluccana, Willd.

Aleurites moluccana, Willd.; Müll. Arg. in DC. Prodr., xv. 2, p. 723; Benth., Fl. Austr., vi. p. 128; Seem., Fl. Vit., p. 223; Nadeaud, Enum. Pl. Tahiti, p. 73; Mann in Proc. Amer. Acad., vii. p. 203.

Aleurites triloba, Forst., Char. Gen. Pl., p. 112, t. 56; Miq., Fl. Ind. Bat., i. 2, p. 385; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 118, 128, 138, et 148.

Arrou.—A tree generally spread in Polynesia, and occurring in North-eastern Australia, as well as some of the Moluccas; and it is now naturalised in most other tropical countries. It is one of the most abundant trees in some of the islands of Polynesia, yielding an oil and other products in common use. Nadeaud states that in Tahiti it is widely spread, growing from the sea-shore to an altitude of upwards of 3000 feet. There are only two other species of the genus, and they inhabit the same region.

Codiæum variegatum, Blume var.

Codiæum variegatum, Blume var.; Müll. Arg. in DC. Prodr., xv. 2, p. 1119 (*varietates*); Seem., Fl. Vit., p. 231; Benth., Fl. Austr., vi. p. 147.

Codiæum moluccanum, Dcne., Herb. Timor. Descr., p. 157; Miq., Fl. Ind. Bat., i. 2, p. 383.

Arrou; Ki.—The genus *Codiæum*, as circumscribed by Bentham and Hooker (Gen. Plant., iii. p. 300), comprises four species, which inhabit the Malayan Archipelago, Polynesia, and Australia. The present species is widely spread in India, the Archipelago, and Polynesia, where there are many varieties having variegated foliage, commonly cultivated for ornamental purposes. Seemann states that a great many varieties and subvarieties of this species are cultivated by the natives in the Fiji Islands, and they all have distinguishing names. There are specimens in the Kew Herbarium from the Isle of Pines, near New Caledonia, from Tanna, New Hebrides, from Pig Island in the Louisiade group, from the Admiralty, and from Samoa; but it is not included in Nadeaud's Enumeration of Tahitian Plants. Müller cites the following plates in Rumphius' Herb. Amb. as varieties of this plant: vol. i., tt. 25–27.

Manihot utilissima, Pohl.

Manihot utilissima, Pohl.; DC., Prodr., xv. 2, p. 1064.

Timor Laut.—A tropical American plant, extensively cultivated in many warm countries for its edible root. Another species, *Manihot palmata*, Müll. Arg., of the same origin, is also cultivated for the same purpose, and had already been introduced by settlers in Fiji when Seemann visited the islands (see Fl. Vit., p. 229). *Manihot* is a genus of about eighty described species, all of them American, and the majority Brazilian.

Claoxylon rubescens, Miq.?

Claoxylon rubescens, Miq.? Fl. Ind. Bat., i. 2, p. 387.

Arrou.—This species was founded upon Javanese specimens. The genus, which consists

of upwards of forty species, is spread over Tropical Asia and Africa, and there are three or four apparently endemic species in North-eastern Australia. An imperfect specimen of what may be a second specimen of this genus was collected in Arrou.

Acalypha grandis, Benth.

Acalypha grandis, Benth. in Hook. Lond. Journ. Bot., 1843, p. 232; Seem., Fl. Vit., p. 224; Müll. Arg. in DC. Prodr., xv. 2, p. 806.

Ki.—This tree seems to be common in the Archipelago and Polynesia, but it does not extend to Australia. There are specimens in the Kew Herbarium from the Philippines, the Gilbert, Ellice, Fiji, and Navigator's groups; also from the Admiralty Islands and New Hebrides. *Acalypha* is a genus of upwards of 200 species, generally dispersed in warm countries.

Acalypha pancheriana, Baill. ?

Acalypha pancheriana, Baill.? Adansonia, ii. p. 225; DC., Prodr., xv. 2, p. 808.

Ki.—It is very doubtful whether this is the same as the original New Caledonian plant. Whatever it may be, the same species was also collected by Mr Moseley in Api, New Hebrides.

Acalypha indica, Linn.

Acalypha indica, Linn., Herb. Timor. Descr., p. 160; Miq., Fl. Ind. Bat., i. 2, p. 404; Müll. Arg. in DC. Prodr., xv. 2, p. 868.

Arrou; Timor Laut; Moa.—An annual, common in India, China, and the Loo Choo Islands, southward to Timor, but not known to extend to Australia or Polynesia. It is also in Tropical Africa, the Mauritius, and the Seychelles.

Mallotus ricinoides, Müll. Arg.

Mallotus ricinoides, Müll. Arg. in DC. Prodr., xv. 2, p. 963; Benth., Fl. Austr., vi. p. 139.
Rottlera zippelii, Hassk., et *Rottlera peltata*, Miq., excl. syn. in Fl. Ind. Bat., i. 2, pp. 394 et 395.

Ki.—A tree ranging from the Philippines and China to the Moluccas and North-eastern Australia. As now usually circumscribed, *Mallotus* consists of about seventy species, spread over the warmer regions of the Old World, but least numerous in Africa.

Mallotus philippinensis, Müll. Arg.

Mallotus philippinensis, Müll. Arg. in DC. Prodr., xv. 2, p. 980; Benth., Fl. Austr., vi. p. 141.
Rottlera tinctoria, Roxb., Pl. Corom., ii. p. 36, t. 168.

Letti.—A common tree throughout Tropical India and China, southward to Australia, but apparently not in Polynesia, where it is replaced by *Mallotus tiliæfolius*.

Mallotus muricatus, Müll. Arg. ?

Mallotus muricatus, Müll. Arg. in DC. Prodr., xv. 2, p. 972?

TIMOR LAUT; BABAR.—The true plant is found in Ceylon, Java, Philippines, and Timor.

Mallotus albus, Müll. Arg.

Mallotus albus, Müll. Arg. in DC. Prodr., xv. 2, p. 965.
Rottlera alba, Roxb., Fl. Ind., iii. p. 826; Miq., Fl. Ind. Bat. Suppl., p. 453.

TIMOR LAUT.—Widely spread in India, and extending to Sumatra and Java.

Mallotus moluccanus, Müll. Arg.

Mallotus moluccanus, Müll. Arg. in DC. Prodr., xv. 2, p. 958.
Rottlera multiglandulosa, Blume; Dcne., Herb. Timor. Descr., p. 158.
Melanolepis multiglandulosa, Reichb. f. et Zoll.; Miq., Fl. Ind. Bat., i. 2, p. 399.

TIMOR LAUT; DAMMAR.—From the Philippines and the Marianne Islands to Timor.

Mallotus repandus, Müll. Arg.

Mallotus repandus, Müll. Arg. in DC. Prodr., xv. 2, p. 981; Benth., Fl. Austr., vi. p. 142.
Rottlera scabrifolia, Adr. Juss.; Dcne., Herb. Timor. Descr., p. 157.

TIMOR LAUT.—India, China, and the Philippines, to North-eastern Australia and New Caledonia.

Macaranga tanarius, Müll. Arg.

Macaranga tanarius, Müll. Arg. in DC. Prodr., xv. 2, p. 997; Benth., Fl. Austr., vi. p. 146.

ARROU; TIMOR LAUT.—A shrub ranging from India, South China, and the Philippines, southward to Eastern Tropical Australia and the New Hebrides. *Macaranga* comprises about eighty species, spread all over the tropical regions of the Old World.

Macaranga involucrata, Baill. var. ?

Macaranga involucrata, Baill. var.? Etud. Euphorb., p. 432; Müll. Arg. in DC. Prodr., xv. 2, p. 1011; Benth., Fl. Austr., vi. p. 146.

ARROU; KI; TIMOR LAUT.—Amboina, and other islands of the Archipelago, and Queensland in North-eastern Australia. There are also fragments of three or four other species of this genus from Ki and Timor Laut.

Ricinus communis, Linn.

Ricinus communis, Linn.; Müll. Arg. in DC. Prodr., xv. 2, p. 1017; Seem., Fl. Vit., p. 229; Miq., Fl. Ind. Bat., i. 2, p. 390–391 (species 1–6); Mann in Proc. Amer. Acad., vii. p. 203; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 120 et 147; Rumph., Herb. Amb., iv. p. 90.

ARROU.—The castor-oil plant is now very generally spread in tropical and subtropical regions, and it is uncertain where it is really indigenous; but Africa is regarded as its

original home. It is not a common plant in oceanic islands, though it is one of the few collected in South Trinidad by Dr Copeland. Seemann states that he found it far in the interior of Viti Levu, but he adds that it is in none of the older Polynesian collections, nor is it alluded to by the older botanists as existing in any part of Tropical Polynesia. Jouan, *loc. cit.*, states that Dr F. D. Bennett signalised the existence of a species of *Ricinus* in the Marquesas Islands, where the natives called it "Toï," and that the same was very common in the Sandwich Islands. Nadeaud does not include *Ricinus* in his Enumeration of Tahitian plants, nor is it given in Bentham's Flora Australiensis; but Bennett (Gatherings of a Naturalist in New South Wales, p. 332) mentions that it grew commonly in New South Wales, propagated by self-sown seeds, or conveyed by birds.

Gelonium bifarium, Dcne.

Gelonium bifarium, Dcne., Herb. Timor. Descr., p. 156.
Gelonium glomerulatum, Hassk.; Müll. Arg. in DC. Prodr., xv. 2, p. 1128.
Gelonium obtusum, Miq., Fl. Ind. Bat. Suppl., p. 452.

Timor Laut.—Philippines, Sumatra, and Java, to Timor. A small genus, restricted to the warmer parts of Asia and Africa.

Carumbium populifolium, Reinw.

Carumbium populifolium, Reinw.; Miq., Fl. Ind. Bat., i. 2, p. 414; Benth., Fl. Austr., vi. p. 150.
Carumbium populneum, *Carumbium sieberi*, et *Carumbium platyneuron*, Müll. Arg. in DC. Prodr., xv. 2, pp. 1144 et 1145, fide Benth.

Arrou.—A shrub or small tree, ranging from the Philippines and Java to Eastern Australia, southward to Victoria, and to some of the Pacific Islands.

Excæcaria agallocha, Linn.

Excæcaria agallocha, Linn.; Benth., Fl. Austr., vi. p. 152; Miq., Fl. Ind. Bat., i. 2, p. 415; Seem., Fl. Vit., p. 232.

Timor Laut.—An essentially littoral tree, often growing in the tidal forests. It inhabits the coasts of Tropical India, the Archipelago, and North-eastern Australia; also New Caledonia, the Fiji and Friendly Islands.

URTICACEÆ.

Celtis paniculata, Planch.

Celtis paniculata, Planch.; DC., Prodr., xvii. p. 182; Benth., Fl. Austr., vi. p. 156; Seem., Fl. Vit., p. 234.
Solenostigma paniculatum, Endl., Prodr. Fl. Norf., p. 42.

Timor Laut.—Eastern Australia, from the Gulf of Carpentaria to Kiama, in New South Wales; also in Norfolk Island. The genus *Celtis* is diffused all round the northern

hemisphere, and extends into the southern in America, Africa, and Australia. Finally, *Celtis pacifica*, Planch., inhabits the Tongan and Marquesas Islands.

Trema timorensis, Hemsl.

Sponia timorensis, Dcne., Herb., Timor. Descr., p. 170; DC., Prodr., xvii. p. 196; Miq., Fl. Ind. Bat., i. 2, p. 216.

Timor Laut.—Also in Timor. *Trema* is wanting in the north temperate zone, but in the tropics and in southern subtropical regions it is as widely spread as *Celtis* is in the northern. Two species occur in Polynesia.

Trema angustifolia, Lindl.

Trema angustifolia, Lindl. in Wall. Cat., n. 3691.
Sponia angustifolia, Planch. in DC. Prodr., xvii. p. 202.

Babar.—South China and Malayan Peninsula, but not recorded before from the Archipelago.

Fatoua pilosa, Gaud.

Fatoua pilosa, Gaud., Voy. Bonite, t. 84; Bureau in Ann. Sci. Nat. ser. 5, xi. p. 375; Benth., Fl. Austr., vi. p. 182.
Fatoua lanceolata, Dcne., Nouv. Ann. Mus. Par. iii. p. 492; Miq., Fl. Ind. Bat., i. 2, p. 282.

Ki; Timor Laut; Lakor.—Apparently an annual herb, although the stem becomes woody below; ranging from China, Japan, and the Philippines, through the Archipelago to North Australia; also in New Caledonia, and there is a specimen in the Kew Herbarium labelled "Assam," without a collector's name. Bentham, *loc. cit.*, states further that it is dispersed over the South Sea Islands, but this is apparently a slip of the pen, for there are no specimens from that region in the Kew Herbarium, and we find no other record of its existence, either in Seemann's Flora Vitiensis, or elsewhere.

Ficus pilosa, Reinw.

Ficus pilosa, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 260; Benth., Fl. Austr., vi. p. 164.
Urostigma pilosum, Miq., Fl. Ind. Bat., i. 2, p. 351.

Timor Laut.—This species has been collected in Sumatra, Java, Borneo, Banca, Timor, New Guinea, and Queensland in Australia. The genus *Ficus* is one of the largest genera in the vegetable kingdom, upwards of 600 species being represented in the Kew Herbarium; and, judging from the proportion of new ones in recent collections from various parts of the world, the total number in existence must be much greater. By far the greatest concentration of species is in Tropical Asia, including the Archipelago, and it is in Asia only—in China and Japan—where the genus is strongly represented in

quite temperate regions. One species, the common one, occurs in the Mediterranean region; two or three inhabit South Africa; but in Chili there is none. Indeed, the genus scarcely extends south of the tropics in South America, and in North America the northern limit is in South Florida, where three species have been gathered. There is also a considerable number of species in Polynesia, but they mostly inhabit the groups of islands nearest to the Indian Archipelago, only two species, *Ficus tinctoria* and *Ficus prolixa*, reaching the Society Islands, and none apparently the Marquesas. Nor is the genus represented by any indigenous species in the Sandwich Islands or Galapagos; yet a very interesting collection of plants from some of the most remote of the Pacific Islands, presented to the Kew Herbarium in 1882 by J. S. Arundel, Esq., contains a specimen of a species of *Ficus* from Fanning, a small island in the North Pacific in about the same longitude as the centre of the Sandwich Islands, but only about 4° 50′ north of the equator. The specimens are merely barren shoots, but there is no doubt about the genus; and it is noted that they were taken from a tree which "grows about 100 feet high, and resembles a banyan." Finally, there are between thirty and forty species, known from Australia chiefly from within the tropics, and none extending to Victoria, South or West Australia. In addition to those enumerated below, there are at least half a dozen undetermined species in the collections from the South-eastern Moluccas.

Ficus retusa, Linn.

Ficus retusa, Linn., Benth., Fl. Austr., vi. p. 166; Miq. in Ann. Mus. Lugd. Bat., iii. p. 267.
Urostigma retusum, Miq., et *Urostigma nitidum*, Miq., Fl. Ind. Bat., i. 2, p. 345.

Arrou; Ki; Moa.—A very common species, ranging from India, South China, and the Philippines, to New Guinea and North-eastern Australia.

Ficus benjamina, Linn.

Ficus benjamina, Linn., Mant., p. 129; Benth., Fl. Austr., vi. p. 167.
Urostigma benjaminum, Miq., Fl. Ind. Bat., i. 2, p. 346.
Ficus neglecta, Dcne., Herb. Timor. Descr., p. 166.

Ki; Timor Laut.—Widely dispersed in India and throughout the Archipelago, where, however, it was often planted, according to Miquel. It has also been found in Rockingham Bay, on the coast of Queensland, Australia.

Ficus quercifolia, Roxb.

Ficus quercifolia, Roxb., Fl. Ind., iii. p. 534; Miq., Fl. Ind. Bat., i. 2, p. 297.

Arrou.—This species was founded upon specimens cultivated in the Calcutta Botanic Garden, and obtained from Bencoolen in Sumatra. It has since been collected in Moulmein, by T. Lobb; and Miquel doubtfully records it from Java.

Ficus ampelas, Burm.

Ficus ampelas, Burm.; Miq., Fl. Ind. Bat., i. 2, p. 303, et in Ann. Mus. Bot. Lugd. Bat., iii. p. 272.
Ficus rubricaulis, Dene., Herb. Timor Descr., p. 168.

Timor Laut.—Also in Java, the Celebes, and Timor.

Ficus rostrata, Lam.

Ficus rostrata, Lam.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 274, et Fl. Ind. Bat., i. 2, p. 307.

Ki.—Generally dispersed in the Archipelago, extending to Sumatra and the Philippines. It is very variable in foliage, and includes the forms at first described by Miquel as species under the names *Ficus lobbii*, *Ficus raridens*, *Ficus obtusidens*, and *Ficus angulidens*.

Ficus decaisneana, Miq.

Ficus decaisneana, Miq., Fl. Ind. Bat., i. 2, p. 312.
Ficus firmula, Miq., et *Ficus trematocarpa*, Miq. in Ann. Mus. Bot. Lugd. Bat., i. 2, p. 224.

Ki; Timor Laut; Lakor.—Also in Ceram, Buru, Amboina, and Timor.

Ficus fistulosa, Reinw.

Ficus fistulosa, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 284.

Dammar.—A very distinct species, of which we have seen specimens from the Khasya Mountains in India, from Java, and from Borneo.

Ficus ribes, Reinw.

Ficus ribes, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 284.
Covellia ribes, Miq., Fl. Ind. Bat., i. 2, p. 325.
Covellia paniculata, Miq., et *Covellia microcarpa*, Miq. in Hook. Lond. Journ. Bot., vii. (1848), pp. 466 et 467.

Arrou.—Philippines and Sumatra, through the Archipelago.

Ficus magnifolia, F. Muell.

Ficus magnifolia, F. Muell.; Benth., Fl. Austr., vi. p. 171.

Arrou; Dammar.—The only other specimens we have seen are from Mount Elliott and Rockingham Bay, Queensland, Australia.

Ficus pumila, Linn.

Ficus pumila, Linn.; Miq. in Ann. Mus. Bot. Lugd. Bot., iii. p. 294; Maximowicz in Mélanges Biologiques, Diag. Pl. Nov. Asiat., iv. p. 342.
Ficus stipulata, Thunb., *fide* Miqueli.

Arrou.—The specimen is a barren form, and may possibly belong to a different species. *Ficus pumila* is common in Japan, and also occurs in China.

Fleurya interrupta, Gaud.

Fleurya interrupta, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 228; Seem., Fl. Vit., p. 237; Nadeaud, Enum. Pl. Tahiti, p. 41; Mann in Proc. Amer. Acad., vii. p. 200; F. Muell., Syst. Census Austr. Pl., p. 22.

Ki; Timor Laut.—An exceedingly common herb throughout the Archipelago and Polynesia; also in India, Eastern Africa, and North-eastern Australia.

Laportea crenulata, Gaud.

Laportea crenulata, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 231.

Arrou; Timor Laut.—An arboreous plant generally diffused in Tropical Asia, but not in Polynesia nor in Australia, where it is replaced by other species. *Laportea* numbers between twenty and thirty species spread over the warmer regions of the Old World; a few inhabiting Mexico and extratropical North America.

Procris pedunculata, Wedd. var.

Procris pedunculata, Wedd. var.; DC., Prodr., xvi. 1, p. 191; Nadeaud, Enum. Pl. Tahiti, p. 44; Baker, Fl. Maurit., p. 276.
Procris cephalida, Comm.; Seem., Fl. Vit., p. 241.
Procris lucida, Spreng., Syst. Veg., iii. p. 846.
Elatostema pedunculatum, Forst., Char. Gen. Plant., p. 106, t. 53.
Dorstenia lucida, Forst., Prodr. Fl. Ins. Austr., p. 11.

Arrou.—Philippines, Java, and Timor, and common throughout Eastern Polynesia, and as far in Western Polynesia as the Society Islands; also found in the Mauritius, Seychelles, Madagascar, and the Comoro Islands. There are about half-a-dozen species of *Procris*, restricted to Tropical Asia, including Polynesia, Africa, and the Norfolk Island. *Procris montana*, Steud., has recently been discovered in Australia.

Bœhmeria sp.

Ki.—This is perhaps *Bœhmeria nivea*, Hook. et Arn., which is widely spread, both cultivated and wild, in Tropical Asia. The genus is a considerable one, generally spread in Tropical Asia and America, and extending into North America, and southward to Chili, and in Eastern Asia as far north as Japan. There are several species in Polynesia, but the genus is not recorded from Australia.

Pouzolzia pentandra, Benn.

Pouzolzia pentandra, Benn., Pl. Jav. Rar., p. 66, t. 14.
Memorialis pentandra, Wedd. in DC. Prodr., xvi. 1, p. 235.
Hyrtanandra pentandra et *Hyrtanandra javanica*, Miq., Fl. Ind. Bat., i. 2, p. 261.

Timor Laut.—Throughout India and the Archipelago, but not found either in Polynesia or Australia. The genus comprises about fifty species, spread nearly all over the warmer regions, but less numerous in America than in the Old World.

Pipturus argenteus, Wedd.

Pipturus argenteus, Wedd.; Benth., Fl. Austr., vi. p. 185; Nadeaud, Enum. Pl. Tahiti, p. 45.
Pipturus propinquus, Wedd.; Seem., Fl. Vit., p. 244; Miq., Fl. Ind. Bat., i. 2, p. 268.

Arrou; Timor Laut.—A tree ranging from Java and the Marianne Islands to North-eastern Australia, Fiji Islands, and the New Hebrides. The allied *Pipturus velutinus* has a similar distribution in the Archipelago, but does not reach Australia, or at least, we have seen no specimens thence. In Polynesia, on the other hand, it has a much wider range, extending from the New Hebrides to the Ellice and Marquesas groups. The genus is also represented in the Mascarene and Comoro Islands, and in New Zealand.

Pipturus velutinus, Wedd.

Pipturus velutinus, Wedd.; Seem., Fl. Vit., p. 243; Miq., Fl. Ind. Bat., i. 2, p. 268.

Timor Laut.—Generally dispersed in the Archipelago and Polynesia. See the remarks under *Pipturus argenteus*.

Leucosyke capitellata, Wedd.

Leucosyke capitellata, Wedd. in DC. Prodr., xvi. 1, p. 235 [27] (*varietates plures*).
Leucosyke alba, Zoll. et Mor., *Leucosyke bimensis*, Zoll. et Mor., *Leucosyke mutabilis*, Miq., *Leucosyke villosa*, Miq., *Leucosyke elongata*, Miq., *Leucosyke falcata*, Miq. et *Leucosyke celtidifolia*, Miq. in Fl. Ind. Bat., i. 2, pp. 265, 266.

Arrou; Dammar.—A shrub or small tree spread all over the Archipelago, but not reaching either India or Australia. There are, however, specimens in the Kew Herbarium from New Ireland. The genus consists of about eight species, restricted to the Archipelago and Polynesia.

CASUARINEÆ.

Casuarina equisetifolia, Forst.

Casuarina equisetifolia, Forst., Char. Gen. Pl., p. 103, t. 52; Benth., Fl. Austr., vi. p. 197; Miq., Fl. Ind. Bat., i. 1, p. 874; Seem., Fl. Vit., p. 263; Nadeaud, Enum. Pl. Tahiti, p. 42; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 123, 138, et 147.

Arrou; Ki; Timor Laut; Dammar.—This tree is generally spread in the coast region of Tropical Asia, Africa, Australia, and Polynesia, forming in many places a conspicuous feature in the scenery. It is also naturalised in Tropical America. In Polynesia this is, or was, one of the sacred trees, which was commonly planted in burial places. Ordinarily it grows in the most barren places, unassociated with other trees. It does not extend to the Sandwich Islands. *Casuarina*, the only genus of the order, comprises about twenty-five species, of which nineteen are endemic in Australia, about four inhabit the Archipelago, and as many New Caledonia, while one more, *Casuarina nodiflora*, extends as far into Polynesia as the Fiji Islands. The genus is not represented in New Zealand; yet three or four species are common in Tasmania. The Australian species are spread all over the country.

MONOCOTYLEDONES.

HYDROCHARIDEÆ.

Enhalus acoroides, Rich.

Enhalus acoroides, Rich. in Mém. Inst. Par., 1811, ii. p. 64; Griff., Ic. Pl. Asiat., tt. 149 et 150.
Enhalus kœnigii, Rich.; Miq., Fl. Ind. Bat., iii. p. 237.

Arrou.—A submerged marine plant found on the coasts of Tropical Asia and Madagascar, and also collected by Mr Moseley at Cape York, North Australia. The only species of the genus.

Halophila ovalis, Hook. f.

Halophila ovalis, Hk. f., Fl. Tasm., ii. p. 45; Benth., Fl. Austr., vii. p. 182.

Arrou.—A marine plant, common on the shores of the Indian and Pacific Oceans; also occurring in the Red Sea. It grows both in the mud that is exposed at low water, and in water several fathoms in depth. There are two other species of the genus, both of which inhabit some part of the area of *Halophila ovalis*.

ORCHIDEÆ.

Dendrobium phalænopsis, Fitzgerald ?

Dendrobium phalænopsis, Fitzgerald in Gard. Chron., N. S., xiv. p. 38, et Austr. Orch. i. ?

Timor Laut.—It is a little doubtful whether this is exactly the same as Fitzgerald's plant, which was discovered in Northern Queensland. A fragment of another species of *Dendrobium* is among the plants from Arrou. *Dendrobium* numbers at least 300 described species, the majority of which are concentrated in Tropical Asia, though the genus ranges from China and Japan to New Zealand and the Marquesas Islands.

Phreatia sp.

Arrou.—The specimen is insufficient for satisfactory determination of the species, though there is no doubt concerning the genus. *Phreatia* is a genus of about ten species inhabiting India, the Archipelago, and Polynesia, and one species occurs in North-eastern Australia.

Calanthe sp.

Wetter.—This genus numbers about forty species, mostly inhabiting Tropical Asia, but a few occur in Tropical Africa, America, and Polynesia; and *Calanthe veratrifolia*, a common Asiatic species, is found in Queensland and New South Wales.

Phalænopsis amabilis, Blume.

Phalænopsis amabilis, Blume ; Miq., Fl. Ind. Bat., iii. p. 690.

Timor Laut.—Java and the Philippines, to Buru. The genus is restricted to the Archipelago and the eastern provinces of India.

Vanda lissochiloides, Lindl.

Vanda lissochiloides, Lindl. ; Miq., Fl. Ind. Bat., iii. p. 680.

Arrou.—Philippines and other islands of the Archipelago. The genus is restricted to Tropical Asia, with the exception of *Vanda hindsii*, which reaches Northern Australia. There were scraps of several other indeterminable orchids in the collections.

SCITAMINEÆ.

Curcuma sp. ?

Ki.—This genus numbers between thirty and forty species, mostly inhabiting Tropical Asia. One has been discovered in Queensland ; and the Turmeric (*Curcuma longa*) is widely dispersed in Polynesia, from the Fiji to Tahiti and Easter Island, but as it is commonly cultivated, it is impossible to say where it is really indigenous. Nadeaud states that it is abundant in all the valleys in Tahiti.

Riedelia curviflora, Oliv.

Riedelia curviflora, Oliv. in Hook. Ic. Pl., t. 1419, et Benth. et Hook. f., Gen. Plant., iii. p. 1226.

Arrou.—Also in Buru. As far as at present known, this genus is monotypic, and was founded upon specimens from the islands named.

Clinogyne grandis, Benth. et Hook. f.

Clinogyne grandis, Benth. et Hook. f., Gen. Pl., iii. p. 651.
Maranta grandis, Miq., Fl. Ind. Bat. Suppl., p. 616.

Arrou.—Philippines, Sumatra, Borneo, and the Admiralty Islands ; and the same or a closely allied species occurs in Tropical Africa. A small genus restricted to Tropical Asia and Africa.

Musa paradisiaca, Linn.

Musa paradisiaca, Linn. ; Seem., Fl. Vit., p. 290.

Arrou ?—Wallace[1] includes the plantain among the articles of food of the Aruese ; but he does not state whether it grows in the island.

[1] Malay Archipelago, ii. p. 229.

AMARYLLIDEÆ.

Eurycles amboinensis, Loud.

Eurycles amboinensis, Loud. ; Benth., Fl. Austr., vi. p. 456 ; Miq., Fl. Ind. Bat., iii. p. 582.
Pancratium amboinense, Linn. ; Bot. Mag., t. 1419.

Ki.—A bulbous plant ranging from the Philippines and Java to Amboina, and the islands of the coast of Queensland. The only other species of *Eurycles* is endemic in North-eastern Australia.

Crinum pedunculatum, R. Br.

Crinum pedunculatum, R. Br. ; Benth., Fl. Austr., vi. p. 455.

Timor Laut.—This has a wide area in Australia, ranging from Moreton Bay to the Murray river in South Australia. *Crinum* numbers some sixty species generally diffused in the tropics, and extending into some extratropical regions.

Crinum asiaticum, Linn. vars.

Crinum asiaticum, Linn. vars. ; Benth., Fl. Austr., vi. p. 454 ; Miq., Fl. Ind. Bat., iii. p. 580 ; Seem., Fl. Vit., p. 305.

Arrou ; Timor Laut.—A bulbous plant of the sandy sea-coast of Tropical Asia and North-eastern Australia ; also in the Fiji Islands.

TACCACEÆ.

Tacca pinnatifida, Forst.

Tacca pinnatifida, Forst. ; Benth., Fl. Austr., vi. p. 458 ; Miq., Fl. Ind. Bat., iii. p. 577 ; Rumph., Herb. Amb., v. p. 328, t. 114 ; Seem., Fl. Vit., p. 102 ; Nadeaud, Enum. Pl. Tahiti, p. 35 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 130 et 145 ; Mann in Proc. Amer. Acad., vii. p. 205.

Arrou.—This herbaceous plant is now generally diffused in maritime districts of Tropical Asia and Africa, and throughout Polynesia, as well as on the coast of North-eastern Australia, but is commonly cultivated for its tuberous roots in Polynesia and in some other parts of its area. It is probably not indigenous in Polynesia, at least in those islands nearest to America. Jouan states that it is rare in the Marquesas Islands, only a few plants being found here and there in shady, humid ravines, and the plant as well as the Tahitian name "Pia" he regards as of comparatively recent introduction into Nukuhiva. Nadeaud mentions that it is often cultivated near houses in Tahiti, and also that it abounds in a wild state in many of the valleys. Mann treats it as indigenous in the Sandwich Islands, where, according to Seemann, it grows spontaneously in sunny places, and is also cultivated to a considerable extent. It bears the same name, "Pia," in the Sandwich Islands, and indeed throughout Polynesia. Altogether there are nine species of *Tacca*, three of which are peculiar to Tropical America, and the rest to the Old World. *Tacca palmata*, Blume (*Tacca montana*, Rumph.), or an allied species, occurs in Timor Laut.

DIOSCOREACEÆ.

Dioscorea sp.

TIMOR LAUT.—The genus *Dioscorea* is a large one, numbering nearly 150 species, generally diffused in tropical and subtropical countries, and a few occurring in temperate regions. Several species are widely cultivated.

LILIACEÆ.

Dracæna angustifolia, Roxb.

Dracæna angustifolia, Roxb.; Benth., Fl. Austr., vii. p. 20; Baker in Journ. Linn. Soc. Lond., xiv. p. 526.
Cordyline rumphii, Miq., Fl. Ind. Bat., iii. p. 556, *partim.*

TIMOR LAUT.—A miniature tree, ranging from the Himalayas to North-eastern Australia. This is the only true *Dracæna* that reaches Australia. There are about thirty-five species of *Dracæna* spread over the warmer parts of the Old World; the Brazilian species is now referred to *Cordyline.*

Cordyline terminalis, Kunth.

Cordyline terminalis, Kunth; Baker in Journ. Linn. Soc. Lond., xiv. p. 539; Benth., Fl. Austr., vii. p. 21; Seem., Fl. Vit., p. 311; Mann in Proc. Amer. Acad., vii. p. 207.
Calodracon terminalis, Planch.; Miq., Fl. Ind. Bat., iii. p. 558.
Cordyline sepiaria, Seem., Fl. Vit., p. 311, t. 94.
Cordyline australis, Nadeaud, Enum. Pl. Tahiti, et Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 127, *non* Endl.

ARROU; TIMOR LAUT.—Generally spread over Tropical Asia and Polynesia, and North-eastern Australia. There are several varieties cultivated in Polynesia, and Seemann states that it is not wild in the Fijis. Mann also indicates it as one of those plants introduced into the Sandwich Islands by the aborigines. Both Jouan and Nadeaud confound it with the very distinct New Zealand *Cordyline australis*, which bears in common with it the native name "Ti." It appears to exist in almost all of the Pacific Islands, where all parts of the plant are employed in some way. There are about nine species, ranging from India to Australia and New Zealand, where there are four species, and a tenth in Brazil.

Dianella ensifolia, Redouté?

Dianella ensifolia, Redouté, Lil., t. 1? Benth., Fl. Austr., vii. p. 16; Miq., Fl. Ind. Bat., iii. p. 560; Seem., Fl. Vit., p. 312; Nadeaud, Enum. Pl. Tahiti, p. 34.

ARROU.—There is a little doubt about our plant being the true *Dianella ensifolia*, which is widely spread in Tropical Asia, in the Mascarene and Pacific Islands; also occurring in North-eastern Australia. *Dianella odorata* inhabits the Sandwich Islands, another is found in New Caledonia, a third in New Zealand and Norfolk Island. Finally there are five species in Australia, and four of these are endemic.

COMMELINACEÆ.

Pollia sorzogonensis, Endl.

Pollia sorzogonensis, Endl.; Clarke in DC. Monogr. Phanerog., iii. p. 126; Miq., Fl. Ind. Bat., iii. p. 541.

Aclisia sorzogonensis, E. Mey. in Presl, Reliq. Hænk., i. p. 138, t. 24.

Arrou; Ki; Timor Laut.—Common throughout India, the warmer parts of China, and the Archipelago, and extending to the New Hebrides.

Commelina nudiflora, Linn.

Commelina nudiflora, Linn.; Clarke in DC. Monogr. Phanerog., iii. p. 144.

Timor Laut.—As circumscribed by Clarke, this is generally diffused in warm countries, including Polynesia. The synonymy is very copious, embracing the names *Commelina pacifica*, Vahl, *Commelina cajennensis*, Rich., and *Commelina agraria*, Kunth. A second species was collected in Arrou. The genus numbers about 100 species, several of them having a wide range, like the present.

FLAGELLARIEÆ.

Flagellaria indica, Linn.

Flagellaria indica, Linn.; Miq., Fl. Ind. Bat., iii. p. 249; Benth., Fl. Austr., vii. p. 10.

Arrou; Timor Laut.—A climbing shrub, exceedingly common, especially in maritime districts, in Tropical Asia, Africa, including the Mascarene Islands, and Australia. There are also specimens in the Kew Herbarium from New Ireland and the Solomon Islands, but it does not appear to reach Eastern Polynesia, where, in the Fijis and Samoa, it is replaced by the only other species of the genus, *Flagellaria gigantea*, Hook. f., in Hook. Ic. Pl., t. 1429.

PALMÆ.

Calamus spp.

Arrou.—Specimens of two species of this genus, which has its headquarters in the Archipelago, are in the collections. Nearly 200 species are known, mostly inhabiting Tropical and Subtropical Asia; a few only Tropical Africa and Australia.

Cocos nucifera, Linn.

Cocos nucifera, Linn.; Benth., Fl. Austr., vii. p. 143; Seem., Fl. Vit., p. 275; Miq., Fl. Ind. Bat., iii. p. 64; Nadeaud, Enum. Pl. Tahiti, p. 40; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 127, 136, 145; Mann in Proc. Amer. Acad., vii. p. 204; Moseley, Notes of a Naturalist on the Challenger, p. 367; Wallace, Malay Archipelago, ii. p. 267, *cum icone*.

Arrou; Ki.—The cocoa-nut is essentially a littoral palm, though it will grow inland, and it is now found on nearly all tropical sea-coasts, including Polynesia. Where it originated

will probably never be proved, for it has so long been widely spread, both wild and cultivated, and has names in so many languages, that those who have entered most fully into the subject have been unable to arrive at a satisfactory conclusion. De Candolle[1] states he formerly believed it to have spread from Western America, but with fuller data and more experience in such questions, he inclines to the opinion that its original home is the Indian Archipelago; but as the thirty other species belonging to the genus are restricted to Tropical America, the first opinion seems the sounder. Jouan, *loc. cit.*, p. 128, says that it is not very widely spread in the Marquesas, though there are always groups of it near the houses of the natives. He further observes that its present wide range is not so much owing to the action of oceanic currents as is generally supposed, because, unless buried in or fixed to the soil, the seed perishes. Mann places it in the category of plants introduced into the Sandwich Islands by the aborigines. Neither this nor any other palm inhabits the Galapagos.

Nipa fruticans, Wurmb.

Nipa fruticans, Wurmb.; Miq., Fl. Ind. Bat., iii. p. 150; F. Muell., Syst. Census Austr. Pl., p. 120; Wallace, Malay Archipelago, ii. p. 200.

Arrou.—This is inserted on the authority of Wallace. It is exceedingly common on the sea-shores of Tropical Asia, from the mouths of the Ganges and the Philippines to New Guinea and North-eastern Australia; it also occurs in the Solomon Islands.

Orania aruensis, Beccari. (Plate LXV. I.)

Orania aruensis, Beccari, Malesia, i. p. 76.

Arrou.—Collected by Dr Beccari in the island of Wokan. For further particulars of this palm consult the list of stranded seeds from the Arrou Islands in the Appendix.

PANDANEÆ.

Pandanus spp.

Pandanus, spp.; Wallace, Malay Archipelago, ii. p. 175.

Arrou.—There are fruits of two or three species of *Pandanus* in the collection. The genus comprises at least fifty species, spread over Tropical Asia, Africa, Australia, and Polynesia, but specially numerous in the Archipelago and the Mascarene Islands, where, in certain districts, they form a very conspicuous feature in the vegetation.

AROIDEÆ.

Imperfect specimens of several members of this Order were collected in the South-eastern Moluccas, among them a variety of *Pothos scandens*, or an allied species, and a

[1] Origine des Plantes cultivées, p. 350.

second species of the same genus; both from the Arrou Islands. There is also what appears to be an *Aglaonema* from the same islands, and a large fruit-bearing specimen of an Aroid from Ki.

NAIADACEÆ.

Zostera nana, Roth.

Zostera nana, Roth.; Kunth, Enum. Pl., iii. p. 19; Benth., Fl. Austr., vii. p. 176.
Zostera muelleri, Irmisch; Aschers. in Linnæa, xxxv. p. 168.

Arrou.—Coasts of Southern Australia, Tasmania, and New Zealand, as well as in the northern hemisphere in the Old World.

CYPERACEÆ.

Cyperus ferax, A. Rich.

Cyperus ferax, A. Rich.; Benth., Fl. Austr., vii. p. 286; Clarke in Journ. Linn. Soc. Lond., xx. p. 295, et xxi. p. 191.

Timor Laut.—Widely spread over the tropics, both in America and the Old World.

Cyperus pennatus, Lam.

Cyperus pennatus, Lam.; Benth., Fl. Austr., vii. p. 284; Miq., Fl. Ind. Bat., iii. p. 281; Seem., Fl. Vit., p. 319; Nadeaud, Enum. Pl. Tahiti, p. 33.

Timor Laut.—Widely spread in Tropical Asia and Polynesia; also in Australia and the Seychelles. It is a sea-shore plant.

GRAMINEÆ.

Panicum sanguinale, Linn.

Panicum sanguinale, Linn.; Benth., Fl. Austr., vii. p. 469; Seem., Fl. Vit., p. 325; Nadeaud, Enum. Pl. Tahiti, p. 31.
Digitaria sanguinalis, Scop.; Miq., Fl. Ind. Bat., iii. p. 437.

Timor Laut.—This grass is found almost everywhere in tropical and subtropical countries.

Setaria macrostachya, H.B.K.

Setaria macrostachya, H.B.K., Nov. Gen. et Sp., i. p. 110; Benth., Fl. Austr., vii. p. 493.
Setaria italica, Miq., Fl. Ind. Bat., iii. p. 467, non Beauv.?

Timor Laut.—Common in many parts of Tropical America; also occurring in India, but less commonly, according to Bentham, and in Eastern Australia.

Setaria verticillata, Beauv.

Setaria verticillata, Beauv., Agrost, p. 51; Kunth, Enum. Pl., i. p. 152; Benth., Fl. Austr., vii. p. 494.

Timor Laut.—Almost universally dispersed, as a weed of cultivation, in warm and temperate countries.

Cenchrus calyculatus, Cav.

Cenchrus calyculatus, Cav., Ic. Pl., v. p. 39, t. 463; Kunth, Enum. Pl., i. p. 167; Benth., Fl. Austr., vii. p. 497.
Cenchrus anomoplexis, Labill., Sert. Nov. Caled., p. 14, t. 19; Seem., Fl. Vit., p. 324.

Arrou.—A common littoral grass throughout Polynesia, from New Caledonia and the Fijis to Pitcairn Island. The genus comprises about twelve species, generally diffused in tropical and subtropical regions. *Cenchrus echinatus* is a very widely spread sea-shore sand-binding plant, and Nadeaud includes it in his Enumeration of Tahitian Plants, but we have only seen *Cenchrus calyculatus* from Polynesia. The prickly involucres of the inflorescence of these grasses attach themselves to the clothes and other things, and are thus conveyed from place to place.

Stenotaphrum subulatum, Trin.

Stenotaphrum subulatum, Trin.; Baker, Fl. Maurit., p. 440.

Ki.—It is a little doubtful whether the Ki plant is this species, which inhabits the sea-shores of the Archipelago, Polynesia, and the Mascarene Islands, or *Stenotaphrum americanum*, Schrank (Benth., Fl. Austr., vii. p. 500), which is found on nearly all tropical and subtropical shores.

Spinifex squarrosus, Linn.

Spinifex squarrosus, Linn.; Miq., Fl. Ind. Bat., iii. p. 474.

Lakor; Letti.—An exceedingly common grass on the sandy sea-shores of Tropical Asia, entirely covering large expanses, according to Miquel; yet it does not appear to extend to Australia, where three other species grow—the following, and one endemic; the third also inhabiting the coast of New Zealand and New Caledonia. This is the whole area of the genus.

Spinifex fragilis, R. Br.

Spinifex fragilis, R. Br., Prodr. Fl. Nov. Holl., p. 198.
Spinifex longifolius, R. Br., *loc. cit.*; Benth., Fl. Austr., vii. p. 504; Miq., Fl. Ind. Bat., iii. p. 474.

Ki.—North and West Australia. The late General Munro named the Ki plant, and noted on the label, "very close to *Spinifex squarrosus*, except the foliage." Miquel records this species from Timor.

Coix lachryma, Linn.

Coix lachryma, Linn.; Miq., Fl. Ind. Bat., iii. p. 476; Seem., Fl. Vit., p. 326; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 144.

Ki.—This grass is now common in the tropics of both hemispheres. We have seen no

Australian specimens, however, and there is little doubt that it was introduced into the New World.

Imperata arundinacea, Cyr.

Imperata arundinacea, Cyr.; Benth., Fl. Austr., vii. p. 536; Miq., Fl. Ind. Bat., iii. p. 514; Seem., Fl. Vit., p. 322.

KI.—This South European reed is common in Australia, occurring in all the colonies; it is also widely spread in the temperate and tropical regions of the Old World, and in South America.

Anthistiria gigantea, Cav.

Anthistiria gigantea, Cav., Ic. Pl., v. p. 36, t. 458.
Androscepia gigantea, Brongn.; Miq., Fl. Ind. Bat., iii. p. 506.

WETTER.—Widely spread in Tropical India, and throughout the Archipelago, but not known from Australia or elsewhere. As now circumscribed, *Anthistiria* comprises about ten species spread over the warmer parts of the Old World.

Eleusine indica, Gærtn.

Eleusine indica, Gærtn.; Benth., Fl. Austr., vii. p. 615; Miq., Fl. Ind. Bat., iii. p. 385; Nadeaud, Enum. Pl. Tahiti, p. 32; Seem., Fl. Vit., p. 322.

KI.—Almost everywhere in tropical and subtropical regions, and occurring in some temperate countries; often existing, however, as a colonist only.

Centotheca lappacea, Desv.

Centotheca lappacea, Desv.; Benth., Fl. Austr., vii. p. 640; Miq., Fl. Ind. Bat., iii. p. 398; Nadeaud, Enum. Pl. Tahiti, p. 32; Seem., Fl. Vit., p. 322.

ARROU.—The only species of the genus, generally spread over Tropical Asia and Africa, and throughout Polynesia. It has also been collected on the eastern coast of North Australia.

Bambusa sp. ?

Bambusa sp. ? Wallace, Malay Archipelago, ii. p. 200.

ARROU.—We have seen no specimens, therefore we cannot indicate the species, of which there may be several.

GYMNOSPERMEÆ.

GNETACEÆ.

Gnetum scandens, Roxb.

Gnetum scandens, Roxb., Fl. Ind., iii. p. 518; DC., Prodr., xvi. 2, p. 351.
Gnetum edule, Blume; Miq., Fl. Ind. Bat., ii. p. 1068.

Arrou.—Tropical India and the Archipelago, but not entering Australia. *Gnetum* comprises about fifteen species, generally spread in Tropical Asia, but only one is known to occur in Africa; one of the Archipelago species, *Gnetum gnemon*, has also been found in the Fijis.

CYCADEÆ.

Cycas circinalis, Linn.

Cycas circinalis, Linn.; Miq., Fl. Ind. Bat., ii. p. 1077; Seem., Fl. Vit., p. 268; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 147.

Arrou.—Taken in a broad sense, this species is widely dispersed in Continental Asia, as well as in the Archipelago and Polynesia, and it has also been collected at Cape York and Albany Island, North Australia, in Madagascar, and Western Tropical Africa.

At our request, Mr W. T. Thiselton Dyer has supplied the following particulars of the distribution of the forms of *Cycas circinalis* :—

"As far as I can make out, the forms of this species fall into two groups, of one of which the distribution is predominantly western, the other eastern. *Cycas circinalis*, Linn. (De Vriese, Descriptions et Figures des Plantes Nouvelles et Rares, 1851, tt. 4 et 5), we have from Western Tropical Africa and Madagascar (*Cycas thouarsii*, R. Br.; DC., Prodr., xvi. p. 528), and from Malabar and Ceylon, perhaps also from the Nicobars; and Miquel (Fl. Ind. Bat., ii. p. 1077) records it from the coast districts of Java, Sumatra, Borneo, Timor, and the Moluccas. *Cycas rumphii*, Miq. (De Vriese, Descr. et Fig., 1851, tt. 2 et 3), inhabits the Malay Peninsula? the Moluccas (including Arrou), the Admiralty Islands, Albany Island and Cape York, North Australia, the Solomon Islands (San Christoval, Milne); and a *Cycas* from South China may be this form.

"*Cycas celebica*, Miq. (*Cycas neocaledonica*, Hort.), comes close to *Cycas rumphii*, and might form perhaps a third group with more or less unarmed petioles. I am inclined to regard this as the Polynesian form. It is found in New Caledonia, New Britain, and the Fiji Islands, and to it belongs *Cycas seemanni*, Al. Br. With this must probably be placed *Cycas undulata*, Hort. *Cycas riuminiana*, Regel (Gartenflora, 1863, p. 16, *cum fig. arboris*), probably belongs to a different type. *Cycas papuana*, F. Muell., belongs to the same type as the Australian *Cycas media*, R. Br."

CRYPTOGAMÆ.

FILICES.

The fern vegetation of the Malayan Archipelago is very rich and varied, and the small collection made by Mr Moseley in the South-eastern Moluccas contained several new species. Mr J. G. Baker published a complete enumeration of all the ferns collected by the Challenger Expedition in the Malayan Archipelago and Polynesia, in the fifteenth volume of the Journal of the Linnean Society of London, together with descriptions of the new species. The following were collected in the South-eastern Moluccas by Mr Moseley.

Alsophila polyphlebia, Baker.

Alsophila polyphlebia, Baker in Journ. Linn. Soc. Lond., xv. p. 104.

Height of trunk up to 25 feet.—Frond ample, tripinnate. Rachis of pinnæ pale brown, slightly furfuraceous and rough with raised points. Pinnæ oblong-lanceolate, 2 feet long, 7–8 inches broad. Pinnules sessile, lanceolate-ligulate, 3½ to 4 inches long, an inch broad, cut down to the rachis into close, blunt, distinctly crenated tertiary segments, 2 lines broad. Texture thin, but firm. Both surfaces glabrous, the lower with a few minute bullate scales on the midrib of the tertiary segments. Veinlets 12–14-jugate, close, fine, distinct, deeply forked, the lowest one sometimes twice forked. Sori placed close to the costa, and a space from the edge, with a distinct space between each, sometimes 12–15 to a segment, absent from the upper third of the segment.

Arrou.

Trichomanes pyxidiferum, Linn.

Trichomanes pyxidiferum, Linn.; Hook. and Bak., Synopsis Fil., p. 81; Hook., Sp. Fil., i. p. 124; Hook. and Grev., Ic. Fil., t. 206; Benth., Fl. Austr., vii. p. 703.

Arrou.—Widely dispersed in the tropical regions of both hemispheres.

Davallia repens, Desv.

Davallia repens, Desv.; Hook. and Bak., Synopsis Fil., p. 93; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

Arrou.—Spread nearly all over Tropical Asia, the Mascarene Islands, and Polynesia.

Davallia solida, Swartz., var. *ornata,* Wall.

Davallia solida, Swartz, var. *ornata,* Wall.; Benth., Fl. Austr., vii. p. 715; Hook. and Bak., Synopsis Fil., p. 95; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

Aroru; Ki.—The varieties of this species are widely dispersed in Tropical Asia and Polynesia, and one is found in North-eastern Australia.

Davallia speluncæ, Baker.

Davallia speluncæ, Baker; Hook. and Bak., Synopsis Fil., p. 100; Benth., Fl. Austr., vii. p. 717; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

ARROU.—Tropical Asia, Africa, and Polynesia, and also found in North-eastern Australia.

Lindsaya lobata, Poir.

Lindsaya lobata, Poir.; Hook. and Bak., Synopsis Fil., p. 111; Benth., Fl. Austr., vii. p. 720 (*Lindsæa*); Baker in Journ. Linn. Soc. Lond., xv. p. 106.

ARROU.—Tropical Asia, Polynesia, and North-eastern Australia.

Asplenium falcatum, Lam.

Asplenium falcatum, Lam.; Hook. and Bak., Synopsis Fil., p. 208; Benth., Fl. Austr., p. 746; Hook. f., Handb. Fl. N. Zeal., p. 372; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

KI.—Very widely spread in the tropics of the Old World, including Polynesia, and extending southward to New Zealand; also occurring in West Indies.

Asplenium laserpitiifolium, Lam.

Asplenium laserpitiifolium, Lam.; Hook. and Bak., Synopsis Fil., p. 215; Hook., Sp. Fil., iii. p. 171, t. 103; Benth., Fl. Austr., vii. p. 748; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

ARROU.—This species ranges from Assam in India and Chusan in China to North-eastern Australia and the South Pacific Islands.

Asplenium (Anisogonium) decussatum, Swartz.

Asplenium (*Anisogonium*) *decussatum*, Swartz; Hook. and Bak., Synopsis Fil., p. 243; Hook., Sp. Fil., iii. p. 259; Benth., Fl. Austr., vii. p. 751; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

ARROU.—Spread over the Malayan Archipelago and Polynesia, and extending to North-eastern Australia; also found in the Mascarene Islands and Tropical Africa.

Nephrodium (Eunephrodium) microchlamys, Baker.

Nephrodium (*Eunephrodium*) *microchlamys*, Baker in Journ. Linn. Soc. Lond., xv. p. 107.

Caudex absent. Stipe $\frac{1}{2}$ foot, pale brown, scaleless, finely pilose. Lamina oblong-lanceolate, 2–3 feet long, 12–15 inches broad; bipinnatifid. Pinnæ, below the small entire top ones, about 40-jugate, sessile, linear-ligulate, the largest 7–8 inches long, $\frac{3}{4}$ to $\frac{7}{8}$ inch broad, the lowest not reduced, cut down to a broad wing into close, blunt, entire, rather ascending lobes $\frac{1}{8}$ inch broad, of which the lowest on the anterior side is rather larger than the rest. Texture membranous. Both sides finely pilose, and densely dotted with minute pale brown glands. Veinlets 12–16-jugate, the lowest pair forming a deltoid arch midway between sinus and costa, the next two pairs meeting at the sinus. Sori round, minute, forming a regular row nearer the costa than the edge of the lobes. Involucre minute, persistent.

KI.—General habit of *Nephrodium molle*, with very different sori and venation.

Nephrodium (Eunephrodium) pennigerum, Hook.

Nephrodium (*Eunephrodium*) *pennigerum*, Hook., Sp. Fil., iv. p. 82; Hook. and Bak., Synopsis Fil., p. 292; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

Arrou.—Tropical Asia from the Himalayas, southward through the Archipelago, and also in Tropical Africa.

Polypodium (Dictyopteris) difforme, Blume.

Polypodium (*Dictyopteris*) *difforme*, Blume; Hook. and Bak., Synopsis Fil., p. 318; Baker in Journ. Linn. Soc. Lond., xv. p. 108.

Arrou.—Apparently restricted to the Archipelago and Polynesia.

Polypodium (Niphobolus) macropodum, Baker.

Polypodium (*Niphobolus*) *macropodum*, Baker in Journ. Linn. Soc. Lond., xv. p. 108.

Rhizome woody, short-creeping, a line thick, clothed with minute, adpressed, deltoid, black scales with brown border. Phyllopode 3–4 lines, clothed with scales, just like the rhizome. Proper stipes bordered very nearly to the base. Fronds all alike (barren and fertile), ligulate, very thick and rigid in texture, 4–8 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ broad, the fertile portion contracted, the point acute, the base narrowed very gradually, the upper surface naked, the lower clothed with thin cottony tomentum, like that of *Polypodium adnascens*. Veins entirely hidden. Sori like those of *Polypodium adnascens*, occupying continuously the contracted upper half of the fronds, minute and immersed in the pale brown tomentum, 6–8 in an erecto-patent row between midrib and edge, and each showing distinctly on the upper side of the frond.

Arrou.—Differs from *Niphobolus adnascens*, var. *varius*, by its much thicker and more rigid texture, long phyllopode, and almost obsolete stipes.

Polypodium (Niphobolus) pachydermum, Baker.

Polypodium (*Niphobolus*) *pachydermum*, Baker in Journ. Linn. Soc. Lond., xv. p. 108.

Rhizome wide-creeping, 1 line thick, woody, flexuose, clothed with minute adpressed, lanceolate, black scales, with a brown border. Phyllopode very short. Stipes naked, $\frac{1}{2}$ to 1 inch. Fronds dimorphic; the barren ones oblanceolate-oblong, obtuse, 1–2 inches long, cuneate at the base, $\frac{1}{2}$ to $\frac{3}{4}$ inch broad; the fertile ones ligulate, 3–4 inches long. Veins quite immersed. Texture very thick and rigid, the upper surface naked; the lower with only a coating of minute stellate scales, visible under a lens, with a distinct bare space round each. Sori occupying the upper half or two-thirds of the fertile fronds, superficial, $\frac{1}{2}$ line broad, 6–8 in an erecto-patent row between the midrib and edge.

Ki.—Nearest typical *Niphobolus adnascens*, but much thicker and more rigid in texture, with superficial sori as large as in *Polypodium lingua*, and only spaced lepidote scales.

Polypodium (Phymatodes) millisorum, Baker.

Polypodium (Phymatodes) millisorum, Baker in Journ. Linn. Soc. Lond., xv. p. 109.

Rhizome not seen. Stipes stout, with a narrow wing extending nearly to the base. Lamina linear-ligulate, 2–2½ feet long, 2–2½ inches broad at the middle, narrowed very gradually to both ends, rigidly coriaceous, quite free from hairs or scales on both surfaces. Veins fine, immersed, the main ones zig-zag, ½ to ¾ inch apart in the centre of the frond, distinct three-quarters of the way to the edge; areolæ copious, minute, with abundant free included veinlets. Sori ½ line broad, round, superficial, crowded, filling up the whole of the upper half or two-thirds of the frond, distinctly visible on the upper side.

Ki.—Differs from *Polypodium irioides* by its rigidly coriaceous texture, larger sori, and less distinct veins.

Polypodium phymatodes, Linn.

Polypodium phymatodes, Linn.; Hook. and Bak., Synopsis Fil., p. 364; Benth., Fl. Austr., vii. p. 769; Baker in Journ. Linn. Soc. Lond., xv. p. 110.

Arrou; Ki.—A very common fern, nearly all over the tropics of the Old World and Polynesia, and extending northward to the Loo Choo Islands and Japan.

Polypodium (Drynaria) quercifolium, Linn.

Polypodium (Drynaria) quercifolium, Linn.; Hook. and Bak., Synopsis Fil., p. 367; Benth., Fl. Austr., vii. p. 772; Baker in Journ. Linn. Soc. Lond., xv. p. 110.

Arrou; Ki.—This species ranges from Tropical India and China to Polynesia and North-eastern Australia.

Vittaria elongata, Swartz.

Vittaria elongata, Swartz.; Hook. and Bak., Synopsis Fil., p. 395; Benth., Fl. Austr., vii. p. 718; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—Widely spread over the tropics of the Old World.

Platycerium grande, J. Sm.

Platycerium grande, J. Sm.; Hook. and Bak., Synopsis Fil., p. 425; Benth., Fl. Austr., vii. p. 781; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—This fern ranges from Singapore through the Archipelago to Queensland and New South Wales.

Lygodium dichotomum, Swartz.

Lygodium dichotomum, Swartz; Hook. and Bak., Synopsis Fil., p. 437; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—Malayan Peninsula and Chusan southward through the Archipelago, but not recorded from Australia.

LYCOPODIACEÆ.

Selaginella inæqualifolia, Spring.

Selaginella inæqualifolia, Spring, Monogr. Lycopod., ii. p. 148 ; Baker in Journ. Linn. Soc. Lond., xv. p. 112.

Arrou ; Ki.—Himalayas to Ceylon and Malacca, also in Sumatra; but we have seen no specimens from the islands intervening between this and the South-eastern Moluccas.

MUSCI.[1]

Thyridium fasciculatum, Mitt.

Syrrhopodon fasciculatus, Hook. et Grev. in Brewster's Edinb. Journ. Sci., iii. p. 225; C. Müll., Synopsis Musc. Frond., i. p. 529.

Arrou.—A few barren stems.

The fruit of this species appears to be everywhere rare. Specimens which seem to be but slight varieties in colour or density of foliage come from India, the Eastern Archipelago, Pacific Islands, Australia, and even the western coasts of South America. All the species referable to this group agree in having the primary stems creeping, with numerous branches more or less densely inserted, forming extended patches like *Macromitrium*, thus differing considerably from *Syrrhopodon* and *Calymperes*. The original *Codonoblepharum*, founded on *Codonoblepharum menziesii*, is in fact a *Zygodon* with a more complete peristome, without near affinity to *Thyridium* or *Syrrhopodon*. The calyptra in *Thyridium constrictum* (*Calymperes*, Sull.), found in the Sandwich Islands and also in Borneo, of which fertile stems were gathered in Samoa by the Rev. T. Powell, is very long, descending below the capsule, and is in the middle finely striate, but smooth above and below; it is thus similar to that of *Syrrhopodon*. The *Syrrhopodon obtusifolius*, Lindb. (Hedwigia, 1868, p. 21), described with obtuse leaves, may possibly be one of the states of *Thyridium fasciculatum*, which is very variable in the outline of the leaf points. A narrower leaved moss was described in Seemann's Flora Vitiensis as *Thyridium luteum*, and C. Müller has described another from the same region.

The Australian specimens were named by Hampe *Codonoblepharum subfasciculatum*.

Chætomitrium lancifolium, n. sp.

Caulis repens, ramis brevibus patentibus pinnatis; folia laxe compressa, patentia, lanceolata, acuta, brevissime binervia, concava, infra apicem excavata. Margine superiore implana apiceque flexuosa, serrulata, cellulis angustis dorso papillosa ; perichætialia erecta, magis serrulata ; theca in pedunculo brevi aspero inclinata, cylindracea ; aperculo convexo breviter rostrato.

[1] By William Mitten, A.L.S., and limited to the collections of the Expedition.

Caulis 5 cm.; ramis 4–5 mm. longis cum foliis 2 mm. latis. Folia pallida, luteo-viridia, haud nitida, sicca parum mutata. Pedunculus ruber, 5 mm. longus.

ARROU.—Creeping over dead leaves.

A little smaller than *Chætomitrium rugifolium*, Sull. (Bot. U.S. Expl. Exp., p. 23, t. 22), with leaves of the branches much narrower.

Only one capsule seen with operculum, which may not be complete, for in this group the beak is generally prolonged.

More than thirty species are now known of this curious genus, which in foliage is often similar to some species of *Ectropothecium*, and sometimes to that of some *Meteoria;* the areolation is in all of very narrow cells like those of *Ctenidium*. In most cases the specimens are too scanty to give an adequate idea of their habit of growth; some appear to grow in spreading patches, others, as *Chætomitrium philippinense*, Mont., and *Chætomitrium volutum*, have the main stem creeping and adhering to twigs. These are provided with numerous simple branches which in *Chætomitrium philippinense* curve in various directions and have their foliage imbricate and slightly secund; but there is another species gathered in Borneo by Motley.[1]

Thuidium plumulosum, Dozy et Molk.

Thuidium plumulosum, Dozy et Molk., Bryol. Jav., ii. p. 118.

ARROU.—In very small quantity, barren. This species ranges from Java to New Guinea.

HEPATICÆ.[2]

Chiloscyphus argutus, Nees.

Chiloscyphus argutus, Nees in G. L. et N. Synopsis Hep., p. 183.

ARROU.—A single stem only. Widely spread in the southern hemisphere, and extending northward to the Caroline Islands and Nepal.

[1] *Chætomitrium bornense*, Mitt., n. sp.—Caulis primarius repens, ramis quamplurimis simplicibus rectis approximatis; folia dense inserta, in seriebus quinis imbricata, late ovalia, cymbiformia, concava, dorso scabra, apice breviter mucronata, marginibus incurvis serrulatis, nervis binis brevissimis; perichætium ad ramorum latera, foliis parvis; theca ovalis, suberecta, operculo conico subulato.

Caulis usque ad 2 decim. longus, ubique radicans, rami 2 cm. longi, 1 mm. crassi, nitidi. Pedunculus 3 mm. longus asper. Calyptra generis.

This approximates very nearly to *Meteorium*, especially to the species which, like *Meteorium tetragonum*, have their foliage arranged in a seriate manner, and the resemblance is increased by the shortness of the seta and the nearly erect but unequal-sided capsule; the peristome has the two cells of the external bands of the teeth confluent, and not divided by an interval through which the internal band is seen, as in the *Hookeriæ*.

[2] By W. Mitten, A.L.S.

Radula pinnulata, Mitt.

Radula pinnulata, Mitt. in Seem. Fl. Vit., p. 410.

ARROU.—One or two stems only. A small species with regularly pinnate stems and acute lobules; its fruit has not yet been seen. Originally described from specimens collected in the Isle of Pines, near New Caledonia.

Lejeunia subfusca, Nees.

Lejeunia subfusca, Nees in G. L. et N. Synopsis Hep., p. 315?

ARROU.—A barren specimen, which appears to be this or some closely allied species of the same colour.

Phragmicoma polymorpha, Lacoste.

Phragmicoma polymorpha, Lacoste, Synopsis Hep. Jav., t. 11.

ARROU.—In small quantity, and varying, with leaves quite entire without sinuations on the ventral margin, or, as in the figure, much sinuated, dentate, and angulate; the amphigastrium entire or dentate, and the perianth with two, three, or four ventral folds.

Frullania secundiflora, Mont.

Frullania secundiflora, Mont.; G. L. et N., Synopsis Hep., p. 433.

ARROU; KI.—Founded on Philippine Island specimens. The specimen from Arrou is small, and those from Ki old, but in full fruit.

LICHENES.

No lichens appear to have been collected in the South-eastern Moluccas, or, if any were collected, they were mislaid.

FUNGI.[1]

Agaricus (Flammula) sapineus, Fries.

Agaricus (Flammula) sapineus, Fries, Hymen. Europ., p. 251; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

ARROU.—Europe; South India; Ceylon; Mauritius; Australia; United States; Cuba; Venezuela.

Agaricus (Panæolus) campanulatus, Linn.

Agaricus (Panæolus) campanulatus, Linn.; Fries, Hymen. Europ., p. 311; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

ARROU.—Europe; Ceylon; United States; Cuba.

[1] The geographical distribution of the species is furnished by Dr M. C. Cooke.

Marasmius aruensis, Berkl.

Marasmius aruensis, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

Pileo centro depresso fulvo subtiliter pulverulento; stipite gracili e basi crassiuscula oriundo e fulvo brunneo; lamellis fulvis.

Pileus ½ to 1 inch wide; stem ⅓ to 1½ inch high.

ARROU.

Marasmius aleurocephalus, Berkl.

Marasmius aleurocephalus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Pileo convexo aleuriato rugoso-plicato fulvo; stipite compresso brunneo basi incrassato.

Pileus ¼ inch across; stem ½ inch high.

ARROU.

Marasmius direptus, Berkl.

Marasmius direptus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42. †

Pusillus albidus rugosissimus; pileo primum horizontali demum reflexo; stipite centrali direpto; lamellis paucis adnatis crassiusculis acie obtusis.

About 1½ lines across; stem torn off as the pileus is turned back and left in the centre; the rugose crumpled pileus, under a lens, is very peculiar.

ARROU.

Lentinus leveillei, Berkl.

Lentinus leveillei, Berkl. in Trans. Linn. Soc. Lond., xx. p. 112, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Surinam.

Lentinus hookerianus, Berkl.

Lentinus hookerianus, Berkl. in Hook. Kew Journ. Bot., 1851, p. 44; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—North India; Ceylon.

Lentinus strigosus, Berkl.

Lentinus strigosus, Berkl. in Fries, El., p. 47, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Ceylon; Cuba; Guiana; Brazil.

Lenzites applanata, Fries.

Lenzites applanata, Fries, Ep., p. 404; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—India; Ceylon; Malayan Peninsula; Mauritius; Demerara; Brazil.

Polyporus (Mesopus) xanthopus, Fries.

Polyporus (*Mesopus*) *xanthopus*, Fries, Obs., ii. p. 285; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Spread over all tropical countries.

Polyporus (Pleuropus) sanguineus, Fries.

Polyporus (*Pleuropus*) *sanguineus*, Fries, Ep., p. 444; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—This is spread all over the tropics.

Polyporus (Pleuropus) affinis, Nees.

Polyporus (*Pleuropus*) *affinis*, Nees in Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Malayan Archipelago; Polynesia; Brazil.

Polyporus (Pleuropus) cochlear, Nees.

Polyporus (*Pleuropus*) *cochlear*, Nees in Nov. Act. Nat. Cur., xiii. t. 6; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Java.

Polyporus (Pleuropus) luteus, Nees.

Polyporus (*Pleuropus*) *luteus*, Nees in Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Nicobar Islands; Australia; Cuba; Brazil.

Polyporus (Pleuropus) meleagris, Berkl.

Polyporus (*Pleuropus*) *meleagris*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Pileo flabelliformi stipite brevissimo affixo zonato radiato lineato brunneolo; margine lobato acutissimo quandoque striato; hymenio e pallido umbrino; poris angulatis hic illic sinuatis, dissepimentis rigidiusculis.

Pileus 2–3 inches across, $1\frac{1}{2}$ inches long; pores $\frac{1}{10\dot{3}}$ inch in diameter. Sometimes infundibuliform. There is a variety (a single specimen only) with a longer stem, which is slightly laccate.

ARROU.

Polyporus (Anodermei) armeniacus, Berkl.

Polyporus (*Anodermei*) *armeniacus*, Berkl. in Hook. Kew Journ Bot., 1856, p. 197; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Brazil.

Polyporus (Anodermei) abruptus, Berkl.

Polyporus (*Anodermei*) *abruptus*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Durissimus, imbricatus, reviviscens; pileo lignicolori hic illic rufescente glabrato; hymenio noduloso, juniore pallido, seniore pallescente; poris punctiformibus.

Pilei by confluence 2–3 inches across, adnate, and decurrent behind, very rigid, the hymenium reproduced irregularly and nodulose. A coarse species.

ARROU.

Polyporus (Placodermei) australis, Fries.

Polyporus (*Placodermei*) *australis*, Fries, Ep., p. 464; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

A small form.

ARROU.—Generally distributed in the tropical regions of both hemispheres.

Polyporus (Placodermei) zonalis, Berkl.

Polyporus (*Placodermei*) *zonalis*, Berkl. in Hook. Lond. Journ. Bot., 1847, p. 504, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—India; Ceylon; Borneo; Southern United States; Cuba; Mexico; Brazil.

Polyporus (Placodermei) senex, Nees et Mont.

Polyporus (*Placodermei*) *senex*, Nees et Mont., Syll., p. 160; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Tropical Asia, Africa, and America, also the Admiralty Islands, and in America it extends northward to the Southern United States.

Polyporus (Placodermei) aruensis, Berkl.

Polyporus (*Placodermei*) *aruensis*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo dimidiato tenui sulcato-zonato radiato-rugoso primum pulverulento brunneo, margine tenuiori, hymenio concolori; poris demum elongatis; contextu ferrugineo.

Pileus 2 inches across, $1\frac{1}{2}$ inches long; pores $\frac{1}{60}$ inch in diameter.

ARROU.

Polyporus (Inodermei) scruposus, Fries.

Polyporus (*Inodermei*) *scruposus*, Fries, Ep., p. 473; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Var. pileo duro reniformi velutino repetite sulcato-zonato umbrino contextu rhabarbarino.

ARROU.—India, Mauritius, Australia, and the warmer parts of America.

Polyporus (Inodermei) tabacinus, Mont.

Polyporus (*Inodermei*) *tabacinus*, Mont. in Ann. Sc. Nat., 1835, iii. p. 349; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—Mauritius, Australia, New Zealand, Juan Fernandez and Chili, to Mexico.

Polyporus (Inodermei) floridanus, Berkl.

Polyporus (Inodermei) floridanus, Berkl. in Ann. Nat. Hist., x. p. 376; et in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—British North America, southward through the West Indies and Mexico, to Bolivia and Brazil.

Trametes occidentalis, Fries.

Trametes occidentalis, Fries; Klotzsch in Linnæa, viii. p. 486; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU; KI.—Generally diffused in tropical and subtropical regions.

Trametes cognatus, Berkl.

Trametes cognatus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo dimidiato sulcato-zonato subtiliter scabroso-tomentoso postice glabrescente ochraceo; hymenio plano, poris punctiformibus acie subtiliter tomentosis.

Pileus $1\frac{1}{2}$ inch across, 1 inch long; pores $\frac{1}{150}$ inch in diameter. Externally resembling *Trametes mülleri*, Berkl.; but the pores are very different.

ARROU.

Trametes sanguineus, Klotzsch.

Polyporus persoonii, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—India; Ceylon; Burmah; Samoa and Friendly Islands; Gold Coast; Brazil.

Trametes bicolor, Berkl.

Trametes bicolor, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo reniformi lobato postice sanguineo, antice pallido ruguloso; hymenio umbrino; poris e subhexagonis elongatis; contextu pallido.

Pileus 2 inches across, 1 inch long; pores $\frac{1}{60}$ inch in diameter.

ARROU.

Hexagona arata, Berkl.

Hexagona arata, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Tenuis rigidiuscula imbricata dimidiata v. flabelliformis regulariter sulcato-zonata scabroso-tomentosa umbrinella; hymenio e luteo-umbrino cinnamomeo; poris dentatis.

Pores $\frac{1}{48}$ inch in diameter. Allied to *Hexagona sericea*.

ARROU.

Hexagona similis, Berkl.

Hexagona similis, Berkl. in Hook. Lond. Journ. Bot., 1846, p. 4; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43 (*ubi errore affinis, fide* Cooke).

Arrou.—Ceylon; Australia.

Favolus saccharinus, Berkl.

Favolus saccharinus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo flabelliformi sessili subtiliter velutino glabrescente; poris sinuatis flexuosis.

Pileus $\frac{1}{2}$ to 1 inch across, at first very minutely velvety, so as to have a saccharine appearance; pores arranged in lines proceeding from a common base.

Arrou.

Favolus brasiliensis, Fries.

Favolus brasiliensis, Fries, Ep., p. 498; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Arrou.—North India; Ceylon; Southern United States; Cuba; Surinam; Brazil.

Laschia longipes, Berkl.

Laschia longipes, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo tenui umbilicato pallide aurantiaco, margine lobato; stipite elongato sursum dilatato fissili; poris brevibus angustis sinuatis radiantibus.

About 1 inch across; stem 2 inches high, not $\frac{1}{12}$ inch thick. Specimen bad, but very distinct.

Arrou.

Dædalea indurata, Berkl.

Dædalea indurata, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo albido, disco parvo affixo radiata-rugoso marginem versus zonato; hymenio ochroleuco; poris minutis sinuosis.

Pileus $1\frac{1}{2}$ inches across, 1 long; pores $\frac{1}{60}$ inch in diameter. A very distinct species, of which there is a single specimen only.

Arrou.

Irpex maximus, Mont.

Irpex maximus, Mont., Syll., p. 174; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Arrou.—Cuba; San Domingo.

Stereum lobatum, Fries.

Stereum lobatum, Fries, Ep., p. 547; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—Very widely dispersed in both hemispheres, though it is not recorded from Europe.

Stereum vespilloneum, Berkl.

Stereum vespilloneum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Tenue flabelliforme vertice parvo orbiculari affixo; pileo badio rufo zonato velutino; hymenio badio, margine sterili pallido.

Pileus $2\frac{1}{2}$ to 3 inches across, 2 inches long, then repeatedly zoned velvety, with a few dark, nearly smooth interstices.

ARROU.

Stereum effusum, Berkl.

Stereum effusum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Pallidum margine inflexo lacerato-lobato, lineato pulverulento; hymenio lineato.

Pileus by confluence 3 inches wide, sometimes scarcely lineate, and then more pulverulent.

ARROU.

Stereum induratum, Berkl.

Stereum induratum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Durissimum conchiforme concentrice sulcatum velutinum; hymenio lævi subtiliter pulverulento, contextu rhabarbarino.

Pileus 3 inches across. Distinguished at once by its very hard thick substance from *Stereum ostreatum* and its allies.

ARROU.

Thelephora lamellata, Berkl. et Curt.

Thelephora lamellata, Berkl. et Curt. in U.S. Expl. Exped., xvii. p. 199, t. 1, fig. 7; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—There is also a specimen in the collection from Taviuni given by Dr Good of H.M.S. "Dido."

Lachnocladium furcellatum, Lév.

Lachnocladium furcellatum, Lév. in Ann. Sci. Nat., 1846, v. p. 159; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—Ceylon; Mauritius; Cuba; Surinam; Brazil.

Lachnocladium semivestitum, Berkl. et Curt.

Lachnocladium semivestitum, Berkl. et Curt, Grevillea, North Amer. Fungi, No. 226; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—United States; Gaudaloupe; Australia.

Hirneola rufa, Berkl.

Hirneola rufa, Berkl. in Ann. Nat. Hist., x. p. 384, et Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—New Caledonia; North Australia; Sandwich Islands; Cuba; Brazil.

Peziza hindsii, Berkl.

Peziza hindsii, Berkl. in Hook. Lond. Journ. Bot., 1842, p. 456, et in Journ. Linn. Soc. Lond., xvi. p. 44; Cooke, Mycographia, t. 51, fig. 200.

ARROU.—Ceylon; Admiralty Islands; New Ireland; San Domingo; Cuba; Guiana; Brazil.

Xylaria piliceps, Berkl.

Xylaria piliceps, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Clavula subturbinata coffeata rimosa molli fragili ostiolis subprominulis punctata; stipite gracili concolori laccato rimoso, contextu pallido.

Stem $1\frac{1}{4}$ inches high; head $\frac{1}{2}$ inch high, $\frac{1}{3}$ inch wide. No sporidia were found.

ARROU.

Hypoxylon (Daldinia) vernicosum, Fries.

Hypoxylon (*Daldinia*) *vernicosum*, Fries; Saccardo, Syllog., i. p. 394; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—India; United States; Cuba.

Hypoxylon (Daldinia) concentricum, Grev.

Hypoxylon (*Daldinia*) *concentricum*, Grev.; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—A very widely dispersed species in temperate and tropical regions of both hemispheres.

ALCÆ.

Very few sea-weeds were collected by the Expedition in this region. Dr Dickie enumerates[1] the following, mostly quite common ones, from Arrou :—

Sargassum dentifolium, Turn.? *Turbinaria vulgaris*, J. Agardh; *Hormophysa articulata*, Kütz.; *Padina pavonia*, Linn.; *Dictyota dichotoma*, Huds.; *Hydroclathrus cancellatus*, Bory; *Amphiroa fragilissima*, Linn.; *Melobesia verrucata*, Lamour.: *Caulerpa clavifera*, Agardh; *Halimeda macroloba*, Dene.; *Halimeda opuntia*, Lamour.; *Enteromorpha compressa*, Grev.

[1] *Journ. of the Linn. Soc. of Lond.*, xv. pp. 241, 242.

ADDENDA.

After it was too late to include them in the foregoing enumeration, we were reminded that Dr Beccari had published a number of plants from the Arrou Islands. Dr Beccari has visited the group himself, and, judging from the number of new species in the Orders which he has already elaborated, he must have made a considerable collection. Some further particulars of the vegetation of these islands by the same author, will be found in the Appendix on the drift seeds and seed-vessels.

MENISPERMACEÆ.

Parabæna tuberculata, Beccari.

Parabæna tuberculata, Beccari, Malesia, i. p. 137.

Arrou.—Also New Guinea and Timor. There is one other species of this genus, a native of India.

Tinospora crispa, Miers.

Tinospora crispa, Miers in Ann. Nat. Hist., series 2, vii. p. 38; Beccari, Malesia, i. p. 138.

Arrou.—Widely diffused in the Archipelago, from Sumatra and Java to New Guinea.

Hypserpa polyandra, Beccari.

Hypserpa polyandra, Beccari, Malesia, i. p. 148.

Arrou.—Also in New Guinea. *Hypserpa* is merged in the small Asiatic genus *Limacia* by Bentham and Hooker.

Stephania hernandifolia, Walp.

Stephania hernandifolia, Walp.; Beccari, Malesia, i. p. 154.

Ki.—Very widely diffused in Tropical Asia, Africa, and Australia.

Pachygone ovata, Miers.

Pachygone ovata, Miers; Beccari, Malesia, i. p. 158.

Ki.—This plant inhabits dry maritime regions in the Carnatic and Ceylon. It is also

in the Malayan Archipelago, ranging from Java to Timor, always preferring, according to Beccari, localities near the sea.

OLACINEÆ.

Ryticaryum oleraceum, Beccari.

Ryticaryum oleraceum, Beccari, Malesia, i. p. 121.

KI.—Dr Beccari subsequently described a second species of this genus from New Guinea.

Gonocaryum pyriforme, Scheff.

Gonocaryum pyriforme, Scheff., Ann. Bogor., i. p. 100; Beccari, Malesia, i. p. 123.

ARROU.—Also New Guinea and Amboina. Closely allied to the Indian *Phlebocalymna*.

ARALIACEÆ.

Osmoxylon carpophagarum, Beccari.

Osmoxylon carpophagarum, Beccari, Malesia, i. p. 196.

ARROU.—"Fruit eaten by various kinds of pigeons, as well as the sterile flower-buds, which exactly simulate the ripe berries."—*Beccari.*

Osmoxylon barbatum, Beccari.

Osmoxylon barbatum, Beccari, Malesia, i. p. 197.

KI.

RUBIACEÆ.

Myrmecodia aruensis, Beccari.

Myrmecodia aruensis, Beccari, Malesia, ii. p. 108.

ARROU.—The whole of the first part of the second volume of the Malesia is devoted to these and other plants which shelter ants ("Pianti Ospitatrici").

Myrmecodia echinata, Gaud.

Myrmecodia echinata, Gaud.; Beccari, Malesia, ii. p. 113.

ARROU.—This species also inhabits Rawak, an island on the north coast of Waigou.

Hydnophytum simplex, Beccari.

Hydnophytum simplex, Beccari, Malesia, ii. p. 123.

ARROU.—Both this and the foregoing genus are restricted to the Archipelago and the contiguous countries.

Hydnophytum kejense, Beccari.

Hydnophytum kejense, Beccari, Malesia, ii. p. 123.

KI.

Hydnophytum crassifolium, Beccari.

Hydnophytum crassifolium, Beccari, Malesia, ii. p. 124.

Arrou.—All the species of this genus are singularly local; not one being recorded from two different islands.

MYRISTICEÆ.

Myristica (Eumyristica) myrmecophila, Beccari.

Myristica (*Eumyristica*) *myrmecophila*, Beccari, Malesia, ii. p. 37, t. 1.

Arrou.—Also in New Guinea. The hollow branchlets are inhabited by a species of ant.

PALMÆ.

Areca macrocalyx, Zipp., *δ aruensis*, Beccari.

Areca macrocalyx, Zipp., *δ aruensis*, Beccari, Malesia, i. p. 20.

Arrou.—Found also in New Guinea.

Kentia costata, Beccari.

Kentia costata, Beccari, Malesia, i. p. 36.

This species, which is abundant in the paludal forests of Arrou, is said to be very closely allied to *Kentia moluccana*.

Drymophlœus propinquus, Beccari.

Drymophlœus propinquus, Beccari, Malesia, i. p. 43 et var. *β keiensis*, Becarri, *loc cit.*, p. 44.

Arrou; Ki.

Caryota rumphiana, Mart.

Caryota rumphiana, Mart., *β papuana*, Beccari, Malesia, i. p. 70.

Ki.—This species ranges from Java to New Guinea and North Australia.

Licuala aruensis, Beccari.

Licuala aruensis, Beccari, Malesia, i. p. 83.

Arrou.—Closely allied to the New Guinea *Licuala penduliflora*, Zipp.

Korthalsia sp.

Korthalsia sp., Beccari, Malesia, i. p. 87.

Arrou.—Only fruit of this was collected, and Beccari remarks that it may belong to the New Guinea *Korthalsia zippelii*, Blume.

Calamus sp.

Calamus sp., Beccari, Malesia, i. p. 88.

Arrou.—Flowering specimens only known. *Calamus*, the largest genus of Palms, is especially abundant in the Archipelago.

MONIMIACEÆ.

Kibara coriacea, Endl.

Kibara coriacea, Endl., *β angustifolia*, Beccari, Malesia, i. p. 186.

Arrou.—This species ranges from the Malayan Peninsula and Sumatra and Java to Timor; and there are four other species of the genus endemic in North-eastern Australia, besides three new species discovered in New Guinea, and the following.

Kibara aruensis, Beccari.

Kibara aruensis, Beccari, Malesia, i. p. 188.

Arrou.

CONIFERÆ.

Podocarpus rumphii, Blume.

Podocarpus rumphii, Blume, Rumphia, iii. p. 214; Beccari, Malesia, i. p. 179.

Arrou and Ki.—Also in New Guinea and Amboina.

THE ADMIRALTY ISLANDS.

INTRODUCTORY NOTES.

The collection of plants made by Mr Moseley affords all that we know of the botany of the Admiralty Islands. Like that from the South-eastern Moluccas, it suffered much from damp before it reached this country, and many of the specimens were reduced to such a rotten state as to be past determination; this applies more especially to those unrecognisable from a fragment, consequently the identified species consist largely of familiar littoral plants. Practically, therefore, although Mr Moseley devoted the greater part of his time to collecting plants, the botany of the Admiralty Islands is still unknown; but from the following specimen it may safely be assumed that the peculiar element is not large, and consists mainly of species; for there are imperfect specimens of a considerable number of what are doubtless undescribed species of genera characteristic of the Malayan and Polynesian regions.

Two or three Algæ are recorded as having been previously collected at these islands by Gaudichaud, who was botanist to the French voyage round the world of the "Uranie" and "Physicienne" (1817–1820) commanded by Freycinet; and in the Botany of the voyage,[1] he mentions that they were becalmed for some days near the Admiralty Islands, yet no landing was made. What particularly struck him, was the large quantity of vegetable productions carried from the shores by the high tides, and borne hither and thither by the numerous currents which at that time alone disturbed the tranquillity of the sea. Further reference to this will be found in the Appendix to the present part, on the drift seeds and seed-vessels collected by the Challenger Expedition.

Mr Moseley contributes the following particulars of the aspect and vegetation of the islands:[2]—

"The Admiralty Islands are a group consisting of one large island and numerous small ones. The group lies between latitudes 1° 50′ S. and 3° 10′ S., and longitudes 146° E. and 148° 6′ E. It forms the north-westerly termination of the long curved chain of large islands and groups of islands which, stretching roughly N.E. and S.W., is composed of the New Ireland, Solomon, and

[1] Voyage autour du monde, exécuté sur les corvettes de S. M. l'Uranie et la Physicienne; Botanique, p. 60.

[2] Notes on Plants Collected and Observed at the Admiralty Islands: *Journ. Linn. Soc. Lond.*, xv. p. 73.

New Hebrides groups. The large island of the Admiralty group is distant from New Hanover, the nearest large island of the chain, about 130 miles, and from the nearest point of New Guinea about 150 miles. A series of groups of small islands form connecting links between the Admiralty group and New Guinea; and a number of the smaller islands of the Admiralty group lie between the large island and New Hanover. The centre of the large or main island is placed by D'Entrecasteaux in lat. 2° 18′ S. and long. 146° 44′ E. The island, which is oblong in form, is about fifty miles in extreme length, and sixteen in extreme breadth. It has, together with its immediately adjacent islets, an area of about 550 square miles. The main island is mostly of small elevation, but contains mountain-masses rising to a height of about 1600 feet, which were visible to the eastward of the anchorage of the Challenger in Nares Anchorage. The examination of the islands made by us was confined to the extreme north-western portion of the northern coast of the main island, in the neighbourhood of Nares Bay, and to the numerous small outlying islands which, lying just off the coast, shelter that anchorage.

"The land-surface in the vicinity of Nares Bay consists of a series of low irregular ridges rising one above another, with wide flat expanses at the heads of bays on the coast, which are scarcely or not at all raised above sea-level, and thus are in a swampy condition. The mountains appear from their form to be volcanic; and it is probable that the obsidian used by the natives for their spear-heads is procured in them. A trachytic lava was found to compose one of the outlying islands; and a similar rock was observed on the mainland where it commenced to rise. A platform of coral-sand rock forms the coast-line of the main island in many places; and a similar rock is the only component of most of the small outlying islands.

"From the position of the Admiralty Islands with regard to the equator, their climate is necessarily an extremely damp one. A great deal of exceedingly heavy rain fell during the stay of the Challenger. Rain fell on five days of the seven during which we were at Nares Anchorage, the total fall being 1·66 inches. The temperature of the air ranged between 86° and 75·5° F., the mean of maximum and minimum observations being about 80° F.; and the air was loaded with moisture. Dense clouds of watery vapour hung about the forest-clad ranges, keeping the mountains most frequently concealed; and in the evenings clouds of mist hung about the lower land, looking like smoke rising from between the densely packed trees. In a bay some miles to the eastward of the anchorage of the Challenger, the mouth of a small river, apparently the outlet of the drainage of the mountains on this side, was found, and also a very small brook; but running water was not elsewhere observed, and the rain probably drains to a large extent into the swamps.

"The main island, as viewed from seawards, is seen to be densely wooded everywhere. Along the summits of the ridges cocoa-nut palms show out against the sky, accompanied by areca palms, as can be made out on a nearer view. The general dark-green mass of vegetation on the hill-sides is festooned with creepers, and shows a peculiar horizontal banding of somewhat lighter green, due to the presence in abundance of a leguminous tree (*Acacia ?*), which has its branches and leaves spread in a succession of horizontal layers, contrasting strongly with the general mass of more vertically directed foliage. A closely similar appearance strikes the eye at first sight on viewing the vegetation of the Banda Islands. The tree producing the effect is probably the same in both cases. Unfortunately, of this, as of all the other high trees, no specimens were procured.

"The smaller outlying islands, dotted about in front of the main island, are all thickly wooded. The inhabited ones are distinguished at once by the large number of cocoa-nut trees growing upon them, and forming the main feature of their vegetation.

"In several points of the coast there are mangrove swamps, in one of which I collected three species of mangroves. Where the land rises a little higher, so as not to be constantly overflowed by the tide, there is a sandy beach; and the shore is lined by various littoral trees, amongst which a *Barringtonia*, and a tree with oval leaves and a pear-shaped fruit with a stony kernel (*Ochrocarpus ovalifolius*, T. And.), are the most frequent. The trees overhang the sea with immense horizontal branches; and the bases of many of the trees are constantly washed by the waves; but, nevertheless, have large woody fungi growing upon them, sometimes so low down as also to be frequently immersed. The overhanging branches are loaded with epiphytes, all growing thus suspended over the sea, so that I had to wade up to my middle in order to gather many of them. Amongst these epiphytes are several species of orchids, five or six of which were found in flower or fruit, and a plant with woody stem and flowers sessile upon it with succulent bright pink calyces.[1] Growing with these is a *Hymenophyllum* in profusion, forming continuous sheets of green, a *Niphobolus*, and a *Lygodium*, which twines round the branches in all directions; whilst a *Psilotum* and the long light-green pendent fronds of *Ophioglossum pendulum* hang down from the branches in bunches. Further, a nearly white moss [*Leucophanes* sp.?] forms large, rounded, compact cushions, conspicuous amongst the darker green of the other plants, and reminding me in its habit of antarctic rather than tropical vegetation. *Asplenium nidus* throws up its crowns of fronds in all directions from the branches in great abundance; and the curious inflated boles of a *Hydnophytum*,[2] many of them as much as $1\frac{1}{4}$ feet in diameter, are perched all about in the forks. I saw no specimens of *Myrmecodia armata*, which occurs so commonly with *Hydnophytum* in Aru and the Moluccas. The kind of littoral vegetation just described was seen best developed at Wyville Point.

"At another part of the coast, in the vicinity of the small river, where the shore, being less sheltered, and exposed to a heavy surf, is not encroached upon to its verge by large trees, several common littoral plants occurred which were not found elsewhere;—a small trailing bean with yellow flower [*Vigna lutea*]; a yellow-flowered composite, usually herbaceous, but here in places forming a woody shrub; the large *Crinum* so abundant on the shores at Aru and in the Philippines; and *Ipomœa biloba*, which, curiously enough, was nowhere very abundant. Three species of *Pandanus* grew here also, together with *Casuarina equisetifolia*, and a white-flowered apocynaceous tree with chocolate-coloured ovoid fruits, and an abundant milky juice [*Cerbera odollam*].

"In Nares Anchorage, not very far from our anchorage, and close to the main island, a small thickly-wooded island (Pigeon Island) is inhabited by immense numbers of a fruit-pigeon (*Carpophaga oceanica*).[3] Large numbers of these pigeons were killed; and I preserved specimens of the fruits contained in their crops, all of which fruits I failed to find or reach in the growing condition. Amongst the fruits were abundance of wild nutmegs and wild coffee-berries. The various species of *Carpophaga* must play a most important *rôle* in the distribution of plants, and especially trees, over the wide region inhabited by them. The crops of the birds are found to contain an astonishing quantity of fruits, some even larger than the nutmeg. Many of the fruits are entirely uninjured, and quite fit for germination; and since, when wounded, and probably also often when frightened, or by accident, the pigeons readily eject these fruits and constantly eject the hard kernels, these birds must constantly be transporting the seeds of trees from one island to another. As soon as ever a few littoral trees, such as *Barringtonia*, have established themselves by drifted seeds upon a fresh

[1] *Medinilla halogeton*, S. Moore, n. sp. [2] *Hydnophytum moseleyanum*, Beccari, n. sp.
[3] *Carpophaga rhodinolæma*, Sclater, Zool. Chall. Exped., part viii. p. 31.

coral island, the pigeons alight in their passages upon these trees and drop the germs of more inland trees. I saw the pigeons thus resting on one of the two or three trees as yet growing on Observatory Island, a very small islet in Nares Bay. At Banda formerly the growth of the nutmegs was confined by the Dutch Government to one island of the group, Great Banda, and the trees on the other islands were destroyed. It was found necessary, however, to send a Commission every year to uproot the young nutmeg-trees sown on the other islands, especially Gunong Api, by the fruit-pigeons. Some of the wild nutmegs in the stomachs of the birds from Pigeon Island were soft and partially digested, and unfit for germination.

"The main island immediately opposite Pigeon Island consists of a low swampy flat of coral sandstone covered with a dense growth of high trees. Immediately at the water's edge, along the sandy beach, are the usual littoral trees with banks of seaweeds thrown up at their roots, whilst a few yards inland a different set of trees, with tall straight trunks, grow, the trees being so closely set that it is very sensibly dark beneath them. Amongst these trees is one with a vermilion-red fruit,[1] which fruit was also found at Aru, and, lying thickly scattered on the mud beneath the tree, is a familiar object at both places, and which was further found on the sea-surface off the north coast of New Guinea amongst the driftwood from the Ambernoh river. Whilst the ground beneath is bare and muddy, and beset with the bare roots of the trees, the trunks of the trees and fallen logs in these dark swampy woods are covered with the most luxuriant growth of feathery mosses and *Jungermanniæ*. On one of these tree-trunks I found also a very curious fern, *Trichomanes peltatum*. The fronds of the fern are orbicular in form, and adhere in rows (as connected by the slender rhizome) to the bark. They are pressed absolutely flat against the bark, so as to look like an adhering crust, and have all the appearance of a *Riccia*, or some such form, for which, indeed, I took them when I gathered the specimens by cutting off flakes of the bark. At a few hundred yards inland are tracts covered with young sago palms, with several species of Zingiberaceæ and large swamp-ferns growing beneath them, and a *Sphagnum* in small quantities. On a collecting expedition to this part of the island I crossed the swamp, here about half a mile in width, and came to a steep rise in the land of about thirty feet or so. Here the rock appeared to be volcanic, and the soil, draining itself into the swamp below, was firm and comparatively dry. The vegetation here changed its aspect considerably; and a tree fern, about six feet in height, occurred at the verge of the rise, and also a *Melastoma*. The rising ground itself was covered with a dense growth of trees, with but little underwood. Beneath these trees grew in abundance isolated tufts of *Trichomanes javanicum*, the erect fern-like *Selaginella inæqualifolia* (so abundant in the Fijis, the Aru Islands, and the Moluccas), and a small zingiberaceous herb. I found many trees here which I had not met with in the swampy ground. They were covered with climbing Aroids, of only one species of which was I able to obtain fertile specimens.

"*Asplenium nidus*, and several epiphytic ferns of somewhat similar habit, were abundant; but I missed the large *Platycerium*, so abundant in the Aru Islands. The *Trichomanes javanicum* and all the low vegetation here was bound together by a horsehair-like *Rhizomorpha*, which was in such abundance as to be a hindrance in the securing of good specimens of the plants.

"Of palms I saw, on the whole, in the Admiralty Island, five species—the cocoa-nut, sago, and areca palms, a *Caryota*, and a small fan palm. I procured specimens of leaves only of the two latter. The fan palms appeared identical with one procured in the Aru Islands. I saw no rattans: but

[1] *Tabernæmontana* sp.

they grow in the islands; for in one canoe I saw a rattan stem in use as a cable. A young palm with prickly leaf-stalks, a dried specimen of which is sent, may prove to be of a further species.[1] The cocoa-nut palm is, as has been before mentioned, abundant on the inhabited islands, where young trees are planted by the inhabitants with great care around their villages, each young tree being protected from the numerous pigs or other injury by means of a neat wicker-work cylindrical fence. On the uninhabited islands cocoa-nut palms are occasionally, but not abundantly, present. The natives, however, plant the palms on uninhabited islands; for I found four or five young trees planted on Observatory Island, each carefully girt at its base with a circle of stones. Cocoa-nut palms grow also on the mainland, on the tops of the hill-ridges, mostly in clumps, as if one or a few trees originally established had seeded others around. There can be no doubt that these plants were planted by natives; and most probably the spot occupied by each clump was inhabited at some time. This part of the main island may formerly have been more thickly inhabited than it at present appears to be. I saw no dwarf varieties of the cocoa-nut; the trees are all of the common tall kind. The areca palm is abundant almost everywhere on the main island.

"The sago palm grows, as usual, socially, in swamps; as usual, also, there is a very large preponderance of immature examples which have not yet begun to form a stem. Indeed, it was only in one swamp that any stemmed specimens were met with at all. No doubt the natives lose no time in felling all the mature trees in spots easily accessible from the coast, and very often cut them before they are mature, for fear of their falling into other hands. A Cycad[2] is abundant, and grows occasionally to a height of thirty feet, looking like a palm.

"The three species of *Pandanus* met with are identical with the three found at the Aru Islands. The two larger ones were common and striking features in the aspect of the coast vegetation. I saw no bamboos in the islands, and they are not in general use amongst the natives; but I saw a few chunam boxes made of bamboo joints.

"Amongst the large forest trees an enormous *Ficus*, with the usual wonderful compound stem, was the most striking. A tree also with the vertical plank-like roots, a familiar phenomenon in Philippine forests, was common; but unfortunately, as usual, no specimens from the high trees could be obtained. A few flowers were picked up upon the ground; but it was found impossible to make out to which tree, amongst a number of trunks, a particular blossom spread over the ground belonged. Several araliaceous trees and shrubs were characteristic features of the vegetation. A bright-coloured *Coleus* was amongst the few terrestrial herbs. A *Dracæna*, often beautifully reddened, was common; but no brilliant crotons were seen. A bright-flowered malvaceous tree (*Thespesia populnea*) was amongst the littoral trees. Possibly this yields fibres for ropes, &c., to the natives.

"Fungi were abundant on the dead wood in the swamps and woods; and a considerable number of forms were collected, some of which, I think, are of special interest.[3]

"Seaweeds were cast up on the shores at every tide in great abundance, and yielded a greater variety of species than had before been met with by me on tropical coral coasts."

From Mr Moseley's sketch, and the following list of the plants collected, we can form some idea of how much remains to be done in the investigation of the flora of the Admiralty Islands. The table below is limited to the species of flowering plants which could be named with certainty.

[1] This has not been found.

[2] *Cycas circinalis*, Linn.

[3] A considerable proportion of the species collected were previously unknown.

TABLE *showing the Distribution of the Flowering Plants collected in the Admiralty Islands.*

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
MENISPERMACEÆ.					
Stephania hernandiæfolia	×	×	×	×	...
GUTTIFERÆ.					
Ochrocarpus ovalifolius	×	...	...	...	...
Calophyllum inophyllum	×	×	×	×	...
MALVACEÆ.					
Thespesia populnea	×	×	×	×	×
SIMARUBEÆ.					
Soulamea amara	×	...	...	...	...
OLACINEÆ.					
Cansjera leptostachya	...	×	...	...	...
RHAMNEÆ.					
Smythea pacifica	×	...	...	...	...
Colubrina asiatica	×	×	×	×	...
AMPELIDEÆ.					
Leea æquata	×	...	×	...	...
LEGUMINOSÆ.					
Desmodium umbellatum	×	×	×	×	×
Mucuna gigantea	×	×	×	...	...
Vigna lutea	×	×	×	×	×
Sophora tomentosa	×	×	×	×	×
ROSACEÆ.					
Parinarium laurinum	...	...	...	...	...
RHIZOPHOREÆ.					
Rhizophora conjugata	×	...	×	...	...
Bruguiera rheedii	×	×	×	×	...
Ceriops pauciflora	×	...	×	...	...
MYRTACEÆ.					
Eugenia malaccensis	×	...	×	...	...
Barringtonia speciosa	×	×	×	×	...
Barringtonia racemosa	×	...	×	×	...
MELASTOMACEÆ.					
Melastoma malabathricum	×	×	×	×	...
Medinilla halogeton	...	...	...	...	...
ONAGRARIEÆ.					
Jussiæa suffruticosa	×	×	×	×	×
RUBIACEÆ.					
Oldenlandia paniculata	×	...	×	...	...
Morinda citrifolia	×	×	×	×	×
Guettarda speciosa	×	×	×	×	...
Psychotria turbinata	...	...	...	...	...
COMPOSITÆ.					
Wedelia biflora	×	×	×	×	...
GOODENOVIEÆ.					
Scævola kœnigii	×	×	×	...	...
OLEACEÆ.					
Myxopyrum smilacifolium	×	...	×	...	...
APOCYNACEÆ.					
Cerbera odollam	×	×	×	×	...
Parsonsia spiralis	×	...	×	...	...
BORAGINEÆ.					
Tournefortia argentea	×	×	×	×	...
CONVOLVULACEÆ.					
Ipomœa biloba	×	×	×	×	×
SCROPHULARINEÆ.					
Limnophila serrata	×	×	...	...	...
Limnophila roxburghii	×	...	×	...	...
ACANTHACEÆ.					
Lepidagathis hyalina	×	...	×	...	...
Hemigraphis reptans	×	...	...	...	...
VERBENACEÆ.					
Callicarpa cumingiana	×	...	...	...	...
Clerodendron inerme	×	×	×	...	...
Premna taitensis	...	...	...	...	...
AMARANTACEÆ.					
Cyathula prostrata	×	...	×	×	...
MYRISTICEÆ.					
Myristica glabra	×	...	×	...	...
LAURINEÆ.					
Hernandia peltata	×	×	×	×	...
THYMELÆACEÆ.					
Phaleria blumei	×	×	...	...	...
EUPHORBIACEÆ.					
Euphorbia atoto	×	×	×	...	...
Codiæum variegatum	×	...	×	...	...
Manihot utilissima	×	...	×	×	...
Alchornea javensis	×	...	×	...	...
URTICACEÆ.					
Artocarpus incisa	×	...	×	...	...
Gironniera celtidifolia	×	...	...	...	...
Pipturus argenteus	×	×	...	...	...
Elatostema integrifolium	×	...	×	...	...
CASUARINEÆ.					
Casuarina equisetifolia	×	×	×	×	×
ORCHIDEÆ.					
Dendrobium nitidissimum	...	...	...	...	...
Dendrobium scopa	×	...	...	...	...

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
Agrostophyllum longifolium	×	...	...	...	...
Thelasis triptera	×	...	...	...	...
Tropidia effusa	...	...	...	...	...
SCITAMINEÆ.					
Clinogyne grandis	×	...	×	...	...
AMARYLLIDEÆ.					
Crinum asiaticum	×	×	×	...	...
TACCACEÆ.					
Tacca pinnatifida	×	×	×	×	...
PALMÆ.					
Cocos nucifera	×	×	×	×	×
CYPERACEÆ.					
Hypolytrum latifolium	×	×	×	×	...
Scleria sumatrensis	×	...	...	...	...
GRAMINEÆ.					
Ischæmum muticum	×	×	×	...	...
Oplismenus compositus	×	×	×	×	×
Centotheca lappacea	×	×	×	×	...
CYCADEÆ.					
Cycas circinalis	×	...	×	×	...

Out of a total of sixty-nine species of flowering plants, thirty-five are common to these islands and the South-eastern Moluccas, as a comparison with the table at p. 107 shows. Taking Polynesia as one area, sixty-three of the species extend to two areas; fifty-two to three areas; thirty-four to four areas; twenty-four to five areas; and ten to six areas: thus leaving only six species which are restricted to Polynesia. But, as already observed, the apparently endemic element in the collection does not figure in the table, because the condition of the specimens is such that they cannot be described. Whatever the real proportion of endemic species may prove to be, the fact will remain that a large number of the species are widely diffused plants. One, *Cansjera leptostachya*, was previously only known to inhabit Australia; and there are three, *Limnophila serrata*, *Phaleria blumei*, and *Pipturus argenteus*, only extending to the Malayan Archipelago and Australia. So far as it goes, this fragment of the flora of the Admiralty Islands is more Malayan in character than Polynesian.

ENUMERATION OF THE PLANTS.[1]

DICOTYLEDONES.—POLYPETALÆ.

MENISPERMACEÆ.

Stephania hernandiæfolia, Walp.

Stephania hernandiæfolia, Walp.; Benth., Fl. Austr., i. p. 57; Miq., Fl. Ind. Bat., i. 2, p. 83; Hook. f., Fl. Brit. Ind., i. p. 103.

Admiralty Islands.—Spread nearly all over Tropical Asia and Africa, and extending in Asia northward to Japan. In Australia it ranges from Cape York to Victoria, and there are specimens in the Kew Herbarium from Tahiti and Samoa. As circumscribed by Bentham, this includes *Stephania gaudichaudi*, A. Gr. (Bot. U.S. Expl. Exped., i. p. 37), and several other named forms. *Stephania forsteri*, A. Gr., *loc. cit.*, p. 36 (*Cocculus forsteri*, DC.), is also apparently the same species. Seemann does not mention this plant in his Flora Vitiensis.

GUTTIFERÆ.

Ochrocarpus ovalifolius, T. Anders.

Ochrocarpus ovalifolius, T. Anders., MSS. in Herb. Kew.
Calysaccion ovalifolium, Chois.; Miq., Fl. Ind. Bat., i. 2, p. 512.
Calophyllum excelsum, Zoll. in Nat. en Geneesk. Archief Néérl. Ind., ii. p. 558, *fide* Miq.

Admiralty Islands.—Malayan Archipelago.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Seem., Fl. Vit., p. 12; Nadeaud, Enum. Pl. Tahiti, p. 69; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 101; Mann in Proc. Amer. Acad., vii. p. 156.

Admiralty Islands.—A conspicuous seaside tree in Tropical Asia, Africa, Australia, and Polynesia.

[1] Full references and details of the distribution of those species which occur in the preceding enumeration of plants from the South-eastern Moluccas are not repeated here; the references being limited to the Polynesian literature, with an outline of the distribution.

MALVACEÆ.

Thespesia populnea, Corr.

Thespesia populnea, Corr.; Seem., Fl. Vit., p. 18; Nadeaud, Enum. Pl. Tahiti, p. 67; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 96 et 150.
Hibiscus bacciferus, Forst., Fl. Ins. Austr. Prodr., p. 48.

Admiralty Islands.—This is another very conspicuous seaside tree in tropical regions, especially when in flower. Besides being generally dispersed in the warm regions of the Old World, it is also in America and the West Indies. Whether introduced by man, or carried thither by other means, is uncertain. Mann does not include it in his list of Sandwich Island plants, but there are specimens in the Kew Herbarium thence, collected by Macrae and Diell, and Seemann records having collected it there himself. Forster collected it in Easter Island.

SIMARUBEÆ.

Soulamea amara, Lam.

Soulamea amara, Lam.; Seem., Fl. Vit., p. 34; Miq., Fl. Ind. Bat., i. 2, p. 129.
Cardiophora hindsii, Benth. in Hook. Lond. Journ. Bot., ii. p. 216, et in Bot. Voy. Sulphur, p. 181.

Admiralty Islands.—This tree is found in Java and Borneo, New Ireland, and Solomon Island; and there are other specimens in the Kew Herbarium, labelled "Fiji, Barclay," in the late Mr Bentham's handwriting; but Seemann, *loc. cit.*, states that it has not been collected in the Fiji group; and he is probably right, for Bentham himself (Hook. Lond. Journ. Bot., ii. p. 216) only records it from New Ireland. Another species has lately been discovered in the Seychelles; and there are two species of what may be the same genus from New Caledonia.

OLACINEÆ.

Cansjera leptostachya, Benth.

Cansjera leptostachya, Benth., Fl. Austr., i. p. 394.

Admiralty Islands.—A shrub originally discovered in New Ireland, and subsequently in some of the islands off the coast of Queensland, Australia. There are two or three other species in Tropical Asia.

RHAMNEÆ.

Smythea pacifica, Seem.

Smythea pacifica, Seem., Fl. Vit., p. 41, t. 11.

Admiralty Islands.—Also found in the Fijis and the South-eastern Moluccas.

Colubrina asiatica, Brongn.

Colubrina asiatica, Brongn.; Benth., Fl. Austr., i. p. 413; Seem., Fl. Vit., p. 42; Nadeaud, Enum. Pl. Tahiti, p. 71; Mann in Proc. Amer. Acad., vii. p. 161; Miq., Fl. Ind. Bat., i. 1, p. 648; Hook. f., Fl. Brit. Ind., i. p. 642; Oliver, Fl. Trop. Afr., i. p. 383.
Ceanothus capsularis, Forst., Fl. Ins. Austr. Prodr., p. 18.

Admiralty Islands.—Spread all over the tropics of the Old World, and throughout Polynesia, from New Caledonia to the Marquesas and the Sandwich Islands, growing chiefly in maritime districts. *Colubrina* is a genus of about a dozen species, two besides the present inhabiting Tropical Asia, and the rest America.

AMPELIDEÆ.

Leea æquata, Linn.

Leea æquata, Linn.; Clarke in Journ. Bot., 1881, p. 163.
Leea sambucina, Lawson in Hook. f. Fl. Brit. Ind., i. p. 666, *partim*.

Admiralty Islands.—India and the Malayan Archipelago. A fragment of a second species is in the collection from the Admiralty Islands.

SAPINDACEÆ.

Ratonia sp.

Admiralty Islands.—In the Flora of British India *Ratonia* is reduced to *Cupania*, which thus becomes a large genus, spread nearly all over the tropics, though only one species has been found in Africa.

LEGUMINOSÆ.

Desmodium umbellatum, DC.

Desmodium umbellatum, DC.; Seem., Fl. Vit., p. 56.

Admiralty Islands.—Asia, Africa, Australia, and America, and nearly all over Polynesia, though it does not appear to reach the Sandwich Islands. It is a half shrubby plant, often growing on the sea-beach.

Mucuna gigantea, DC.

Mucuna gigantea, DC.; Benth., Fl. Austr., ii. p. 254; Hook. f., Fl. Brit. Ind., i. p. 186; Seem., Fl. Vit., p. 59; Miq., Fl. Ind. Bat., i. 1, p. 213; Nadeaud, Enum. Pl. Tahiti, p. 80; Mann in Proc. Amer. Acad., vii. p. 164; A. Gr., Bot. U.S. Expl. Exped., p. 442.

Admiralty Islands.—Widely spread in Tropical Asia and Polynesia, and also found in Eastern Australia. Nadeaud states that in Tahiti it climbs over the trees of *Paritium tiliaceum* and *Barringtonia* on the sea-coast.

Vigna lutea, A. Gr.

Vigna lutea, A. Gr., Bot. U.S. Expl. Exped., p. 452; Seem., Fl. Vit., p. 62; Mann in Proc. Amer. Acad., vii. p. 164; Nadeaud, Enum. Pl. Tahiti, p. 80.

Admiralty Islands.—Spread nearly all over the warmer regions, but more especially in maritime districts.

Sophora tomentosa, Linn.

Sophora tomentosa, Linn.; A. Gr., Bot. U.S. Expl. Exped., p. 460; Seem., Fl. Vit., p. 66; Nadeaud, Enum. Pl. Tahiti, p. 81.

Admiralty Islands.—An essentially seaside tree, generally diffused in the warmer regions.

ROSACEÆ.

Parinarium laurinum, A. Gr.

Parinarium laurinum, A. Gr., Bot. U.S. Expl. Exped., i. p. 490, t. 55; Seem., Fl. Vit., p. 75.

Admiralty Islands.—This tree also inhabits the Solomon, Fiji, and Samoan Islands. The genus is spread over the tropical regions, more especially in maritime districts, both of the Old World and America. There is one other Polynesian species.

RHIZOPHOREÆ.

Rhizophora conjugata, Linn.

Rhizophora conjugata, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 584; Hook. f., Fl. Brit. Ind., ii. p. 436.

Admiralty Islands.—Tidal marshes of Tropical Asia, from the Indus eastward, and through the Archipelago, but evidently by no means so common in the southern part of its area as *Rhizophora mucronata*. Henslow, in Hooker's Flora of British India, records it from Africa, but this seems to be a mistake, for there are no specimens in the Kew Herbarium. *Rhizophora mucronata*, Lam., is the common one in the Old World, extending to Eastern Africa, North-eastern Australia, and Polynesia; but, as Seemann remarks (Flora Vitiensis, p. 92), there is no evidence of the existence of true mangroves in Eastern Polynesia. Forster, according to Seemann, mentions a mangrove as occurring in the Society Islands, but there is no specimen of it in his herbarium, nor is there any in the recent collections. Neither Nadeaud nor Guillemin includes a mangrove. *Rhizophora mucronata* is common in the Fijis and in Samoa, and there is also a specimen in the Kew Herbarium from Funafuti in the Ellice group.

Bruguiera rheedii, Blume.

Bruguiera rheedii, Blume; Seem., Fl. Vit., p. 91; Benth., Fl. Austr., ii. p. 494.

Admiralty Islands.—Common in the mangrove swamps of many parts of the Old World, and extending in Polynesia as far as New Caledonia, the Fijis, and Samoa.

Ceriops pauciflora, Benth.

Ceriops pauciflora, Benth. in Hook. Lond. Journ. Bot., ii. 1843, p. 218.

ADMIRALTY ISLANDS.—Also found in New Ireland. It is, perhaps, not specifically different from *Ceriops candolleana*, Arn., which is widely diffused on the sea-coasts of the Old World, including North-eastern Australia and Eastern Africa. *Ceriops* is a small genus restricted to the Old World.

MYRTACEÆ.

Eugenia malaccensis, Linn.

Eugenia malaccensis, Linn.; Seem., Fl. Vit., p. 77; Nadeaud, Enum. Pl. Tahiti, p. 79; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 108 (*Jambosa*); Mann in Proc. Amer. Acad., vii. p. 166.

ADMIRALTY ISLANDS.—Generally diffused in Tropical Asia and Polynesia, but probably introduced in the eastern islands of Polynesia. Jouan states that it is very little spread in the Marquesas, only a few trees existing here and there; and Mann treats it as an introduced tree in the Sandwich Islands.

Barringtonia speciosa, Linn.

Barringtonia speciosa, Linn.; Seem., Fl. Vit., p. 82; A. Gr., Bot. U.S. Expl. Exped., p. 508; Nadeaud, Enum. Pl. Tahiti, p. 79; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 108, 135, 147, et 167.

Barringtonia butonica, Forst., Char. Gen. Pl., t. 38.

ADMIRALTY ISLANDS.—Generally spread in Polynesia, except the Sandwich Islands.

Barringtonia racemosa, Blume?

Barringtonia racemosa, Blume? Seem., Fl. Vit., p. 83.

ADMIRALTY ISLANDS.—The true *Barringtonia racemosa* reaches the Fijis and Samoa.

MELASTOMACEÆ.

Melastoma malabathricum, Linn.

Melastoma malabathricum, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 523; Benth., Fl. Austr., iii. p. 292; Miq., Fl. Ind. Bat., i. 1, p. 507.

Melastoma polyanthum, Blume; Miq., Fl. Ind. Bat., i. 1, p. 507; Hook. f., Fl. Brit. Ind., ii. p. 523.

Melastoma denticulatum, Labill., Sert. Austr. Caled., i. p. 65, t. 64; Seem., Fl. Vit., p. 90.

Melastoma velutina, Seem., Fl. Vit., p. 90, *in nota*.

ADMIRALTY ISLANDS.—As circumscribed by Bentham, this species is very widely spread in Tropical Asia, and extends to Eastern Australia southward to New South Wales. It is also found in the Seychelles, and in Polynesia it reaches New Caledonia, the Fijis, and Samoa. It is very variable. The genus *Melastoma* is restricted to about the same area as the present species.

Medinilla halogeton, S. Moore.

Medinilla halogeton, S. Moore in Journ. Bot., 1880, p. 3.

Admiralty Islands.—A previously undescribed species; and there is a very imperfect specimen of what may be another new species from the same islands. A genus of about fifty species confined to the Old World, and principally concentrated in the Malayan Archipelago.

ONAGRARIEÆ.

Jussiæa suffruticosa, Linn.

Jussiæa suffruticosa, Linn.; Benth., Fl. Austr., iii. p. 307; Miq., Fl. Ind. Bat., i. 1, p. 628; Hook. f., Fl. Brit. Ind., ii. p. 587; Griseb., Fl. Brit. W. Ind., p. 273.
Jussiæa villosa, Lam.; Mann in Proc. Amer. Acad., vii. p. 166.

Admiralty Islands.—This herbaceous plant is now very widely diffused in warm countries in both hemispheres, but often existing only as a colonist. Seemann does not mention it in the Flora Vitiensis, but there are specimens in the Kew Herbarium from Samoa and Tahiti, and Mann records it from the Sandwich Islands, and places it in the category of plants probably introduced into the islands by the aborigines. Bentham treats it as indigenous in Australia.

GAMOPETALÆ.

RUBIACEÆ.

Hydnophytum moseleyanum, Beccari.

Hydnophytum moseleyanum, Beccari, Malesia, ii. p. 125 (*conspectus specierum*).

Description.—*Tuber* magnus, globosus. *Caules* plurimi succulenti, articulis cylindraceis, in extremitatibus vix compressis. *Folia* elliptica, vel ovato-elliptica, vel oblongo-lanceolata, apice parum attenuata et obtusa, basi in petiolum brevem, crassum, abrupte attenuata. *Inflorescentiæ* valde contractæ, tuberculiformes. *Flores* sessiles, fasciculati. *Calyx* cupularis, glaber, limbo brevissimo, integro, truncato, haud ciliato. *Corolla* in alabastro clavata, lobis ovatis, apiculo brevi introflexo præditis, basi inter stamina piloso-barbatis; fauce annulo barbato destituta. *Stamina* antheris basi sagittatis, loculis profunde diremptis, filamento brevi, supra medium affixis. *Stylus* filiformis, stigmate bipartito, in alabastro antheris brevior. *Fructus* . . . *Pyrenia* . . . Beccari MSS.—*Hydnophytum*, n. sp. ? Oliver in H. N. Moseley's Notes on Plants, &c., in Journ. Linn. Soc., xv. p. 74.

Admiralty Islands.

Oldenlandia paniculata, Linn.

Oldenlandia paniculata, Linn.; Hook. f., Fl. Brit. Ind., iii. p. 69; Seem., Fl. Vit., p. 126.

Admiralty Islands.—Widely dispersed in Asia, and in Polynesia ranging from the New Hebrides to the Fiji and Tongan Islands.

Morinda citrifolia, Linn.

Morinda citrifolia, Linn.; Seem., Fl. Vit., p. 129; Nadeaud, Enum. Pl. Tahiti, p. 52; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 111, 135, et 151; Mann in Proc. Amer. Acad., vii. p. 170.

Admiralty Islands.—One of the commonest seaside trees in Polynesia, and generally diffused on tropical coasts.

Guettarda speciosa, Linn.

Guettarda speciosa, Linn.; Seem., Fl. Vit., p. 131; Nadeaud, Enum. Pl. Tahiti, p. 52.
Cadamba jasminiflora, Sonnerat, Voy., ii. t. 128.

Admiralty Islands.—Coasts of Tropical Asia, Eastern Africa and adjacent islands, North-eastern Australia, and almost throughout Polynesia, though we have seen no specimens, and it is not recorded from the Marquesas group by Jouan, nor from the Sandwich Islands by Mann. It abounds in the Fiji, Samoan, Gilbert, Ellice, Friendly, and Society groups, and it has also been collected in Radak and Romanzoff Islands by Chamisso, in Bow Island by Barclay, in Pitcairn Island by Menzies, and in Elizabeth Island by Cuming.

Psychotria turbinata, A. Gr.

Psychotria turbinata, A. Gr. in Proc. Amer. Acad., iv. p. 45; Seem., Fl. Vit., p. 135.

Admiralty Islands.—Also found in the Fijis. *Psychotria* is a genus of some 500 species, spread all over the tropics, and a few extend into subtropical regions; but the greatest concentration of species is in America. In Western Polynesia the species are numerous, and three and four occur as far east as Tahiti, while in the Fijis there are at least thirty species; but the genus does not appear to be represented in the Marquesas nor in the Sandwich Islands. One endemic species inhabits Juan Fernandez.

COMPOSITÆ.

Wedelia biflora, DC.

Wedelia biflora, DC.; Benth., Fl. Austr., iii. p. 539.

Admiralty Islands.—As circumscribed by Bentham, this includes the *Wollastonia forsteriana*, DC. (*Buphthalmum uniflorum*, Forst.), and *Wedelia insularis*, DC., and is spread nearly all over Polynesia, and in the maritime districts of Tropical Asia, Africa, and Australia; but there are several closely allied ill-defined species. One of these, *Wedelia strigulosa*, is recorded by Seemann (Flora Vitiensis, p. 142) as common on all the sea-beaches of the Fiji Islands.

GOODENOVIEÆ.

Scævola kœnigii, Vahl.

Scævola kœnigii, Vahl; Seem., Fl. Vit., p. 145; Nadeaud, Enum. Pl. Tahiti, p. 50; Benth., Fl. Austr., iv. p. 86.
Scævola sericea, Forst., Fl. Ins. Austr. Prodr., p. 89; Mann in Proc. Amer. Acad., vii. p. 187.

ADMIRALTY ISLANDS.—A common seashore shrub in the western groups of Polynesia, less so eastward, though it reaches the Sandwich Islands; also in Tropical Asia and Australia.

MYRSINEÆ.

Ardisia sp.

ADMIRALTY ISLANDS.—*Ardisia* comprises about 200 shrubby and arboreous species widely spread in tropical and subtropical regions, though very rare in Africa. The allied genus *Myrsine* is represented in New Zealand by about half a dozen species.

EBENACEÆ.

Diospyros sp.

ADMIRALTY ISLANDS.—Of this genus upwards of 150 species are described; they are generally spread in warm countries, and a few inhabit north temperate regions.

OLEACEÆ.

Myxopyrum smilacifolium, Blume.

Myxopyrum smilacifolium, Blume; Miq., Fl. Ind. Bat., ii. p. 550; Hook. f., Fl. Brit. Ind., iii. p. 618.

ADMIRALTY ISLANDS.—Tropical Asia, from the Himalayas southward into both peninsulas, and also in Borneo. The closely allied species (or variety) *Myxopyrum coriaceum*, Blume, is represented at Kew by specimens from Malacca, Sumatra, and Java. No other species of this distinct genus are known: it is the *Chondrospermum* of Wallich.

APOCYNACEÆ.

Cerbera odollam, Gærtn.

Cerbera odollam, Gærtn.; Benth., Fl. Austr., iv. p. 306; Hook. f., Fl. Brit. Ind., iii. p. 638.
Cerbera lactaria, Hamilt.; Seem., Fl. Vit., p. 158.
Cerbera forsteri, Seem., *loc. cit. in nota*; Nadeaud, Enum. Pl. Tahiti, p. 55.
Cerbera manghas, Linn.; Forst., Fl. Ins. Austr. Prodr., p. 19; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 114.

ADMIRALTY ISLANDS.—Tropical Asia and North-east Australia, and throughout Polynesia, except the Sandwich Islands. The plant collected in Pitcairn Island by Cuming,

and described by Seemann as a "distinct new species," which he named *Cerbera forsteri*, we agree with Nadeaud should rank as a variety of *Cerbera odollam*. Jouan states that this species is generally diffused in the Marquesas, though most frequent on the sides of the hills. It is also found in the Seychelles, but does not apparently reach Africa itself. There are three or four other species, which all inhabit maritime districts in the Old World.

Tabernæmontana sp.

ADMIRALTY ISLANDS.—There is a specimen of what is probably a species of this tropical genus; and among the seed-vessels picked up on the shore is one which has been identified as that of *Tabernæmontana aurantiaca*.

Parsonsia spiralis, Wall.

Parsonsia spiralis, Wall.; Hook. f., Fl. Brit. Ind., iii. p. 650.

ADMIRALTY ISLANDS.—Himalayas and China, to Ceylon and the South-eastern Moluccas.

ASCLEPIADEÆ.

Hoya sp.

ADMIRALTY ISLANDS.—This is probably a new species, but it is so closely allied to *Hoya diptera*, Seem., of which there are only two flowers at Kew, that we forbear naming it, more especially as authenticated specimens of many of the Malayan species are not to be seen in this country.

BORAGINEÆ.

Tournefortia argentea, Linn. f.

Tournefortia argentea, Linn. f.; Seem., Fl. Vit., p. 170; Nadeaud, Enum. Pl. Tahiti, p. 57.

ADMIRALTY ISLANDS.—Generally diffused on tropical shores in the Old World, and throughout Polynesia, except the Sandwich Islands. Cuming long ago collected it in Ducie Island, and Arundel recently gathered it in the same island, and he notes on his label that it is one of the commonest plants on the low islands in the South Pacific. See list of plants on p. 116 collected by the latter gentleman.

CONVOLVULACEÆ.

Ipomœa biloba, Forsk.

Ipomœa biloba, Forsk.; Hook. f., Fl. Brit. Ind., iv. p. 212.

Ipomœa pes-capræ, Sweet; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 116, 136, 148; Mann in Proc. Amer. Acad., vii. p. 195.

Ipomœa maritima, R. Br., Prodr. Fl. Nov. Holl., p. 486.

ADMIRALTY ISLANDS.—Almost everywhere in maritime districts of tropical and sub-tropical regions, including Polynesia, eastward to the Marquesas and Sandwich Islands.

SCROPHULARINEÆ.

Limnophila serrata, Gaud.

Limnophila serrata, Gaud.; Benth., Fl. Austr., iv. p. 490; Miq., Fl. Ind. Bat., ii. p. 680; Nadeaud, Enum. Pl. Tahiti, p. 59.
Limnophila fragrans, Seem., Fl. Vit., p. 180.
Ruellia fragrans, Forst., Fl. Ins. Austr. Prodr., p. 44.

Admiralty Islands.—Fijis, Tahiti, and North Australia, and Gaudichaud's original was from the Marianne Islands. It grows in swamps and stagnant pools on the coast. *Limnophila* is a genus of herbaceous marsh or aquatic plants, and comprises about twenty species spread over the warmer parts of the Old World.

Limnophila roxburghii, G. Don.

Limnophila roxburghii, G. Don; Hook. f., Fl. Brit. Ind., iv. p. 265.
Limnophila menthastrum, Benth.; Miq., Fl. Ind. Bat., ii. p. 680.
Adenosma triflora, Seem., Fl. Vit., p. 284, *non* Nees.

Admiralty Islands.—North India, China, Formosa, and the Philippines, southward to Java, the Fijis and Samoa.

ACANTHACEÆ.

Lepidagathis hyalina, Nees.

Lepidagathis hyalina, Nees.; Miq., Fl. Ind. Bat., ii. p. 815.

Admiralty Islands.—India and China to the South-eastern Moluccas.

Hemigraphis reptans, T. And.

Ruellia reptans, Forst., Fl. Ins. Austr. Prodr., p. 44; Seem., Fl. Vit., p. 183.

Admiralty Islands.—Southern Moluccas; New Hebrides.

VERBENACEÆ.

Callicarpa cumingiana, Schauer?

Callicarpa cumingiana, Schauer? Miq., Fl. Ind. Bat., ii. p. 887.

Admiralty Islands.—The typical *Callicarpa cumingiana* is from the Philippine Islands.

Clerodendron inerme, R. Br.

Clerodendron inerme, R. Br.; Seem., Fl. Vit., p. 188; A. Gr. in Proc. Amer. Acad., vi. p. 50.
Volkameria inermis, Linn., Fl. Zeyl., p. 231.

Admiralty Islands.—A common seaside shrub in Tropical Asia, Australia, and Western Polynesia.

Premna taitensis, Schauer.

Premna taitensis, Schauer; Seem., Fl. Vit., p. 186, t. 43; Nadeaud, Enum. Pl. Tahiti, p. 57.
Scrophularioides arborea, Forst., Fl. Ins. Austr. Prodr., p. 91.

ADMIRALTY ISLANDS.—This is common in the Fijis, in the Ellice group, Samoa, and eastward to the Marquesas.

INCOMPLETÆ.

AMARANTACEÆ.

Cyathula prostrata, Blume.

Cyathula prostrata, Blume; Seem., Fl. Vit., p. 199; Baker, Fl. Maurit., p. 269.

ADMIRALTY ISLANDS.—An annual herb, widely spread in Tropical Asia, Africa, and in Polynesia.

MYRISTICEÆ.

Myristica glabra, Blume, var.

Myristica glabra, Blume, var.; Miq., Fl. Ind. Bat., i. 2, p. 65.

ADMIRALTY ISLANDS.—From Silhet southward to Sumatra and Java.

LAURINEÆ.

Hernandia peltata, Meissn.

Hernandia peltata, Meissn.; Seem., Fl. Vit., p. 204; Nadeaud, Enum. Pl. Tahiti, p. 48.

ADMIRALTY ISLANDS.—Tropical Asia, Africa, and Australia, and eastward in Polynesia as far as Tahiti.

THYMELÆACEÆ.

Phaleria blumei, Benth.

Phaleria blumei, Benth., Fl. Austr., vi. p. 38.
Drymispermum blumei, Dcne.; Miq., Fl. Ind. Bat., i. 1, p. 885.

ADMIRALTY ISLANDS.—Malayan Archipelago and North-eastern Australia. The genus is restricted to Tropical Asia, and the southern area of the present species.

EUPHORBIACEÆ.

Euphorbia atoto, Forst.

Euphorbia atoto, Forst.; Seem., Fl. Vit., p. 216; Nadeaud, Enum. Pl. Tahiti, p. 72; Benth., Fl. Austr., vi. p. 46.

ADMIRALTY ISLANDS.—India, Ceylon, Malayan Archipelago, and North-eastern Australia, and in Polynesia it extends eastward to Tahiti, and northward to the Marianne Islands, and closely allied species occur in Pitcairn, Elizabeth, and the Sandwich Islands.

Codiæum variegatum, Juss.

Codiæum variegatum, Juss. ; Seem., Fl. Vit., p. 231 ; Benth., Fl. Austr., vi. p. 147.
Codiæum moluccanum, Dcne. ; Miq., Fl. Ind. Bat., i. 2, p. 383.

Admiralty Islands.—Widely dispersed in Tropical Asia and Polynesia, but often cultivated. Seemann, *loc. cit.*, states that many varieties and subvarieties of this plant are cultivated for ornament in the Fijis.

Antidesma n. sp. ?

Admiralty Islands.—There is little doubt respecting this being an undescribed species, but as the specimen bears only two leaves and one cluster of fruit, it is insufficient for description. It is remarkable for the large size of its leaves, which are a foot in length and five inches across. The genus *Antidesma* is a large one, and spread over the warmer parts of the Old World, extending as far north in Asia as Japan. About half-a-dozen species inhabit Australia, and several Polynesia, including one endemic in the Sandwich Islands ; but hitherto none has been discovered in America.

Manihot utilissima, Pohl.

Manihot utilissima, Pohl ; DC., Prodr., xv. 2, p. 1064.

Admiralty Islands.—An American plant, now widely diffused through cultivation.

Alchornea javensis, Müll. Arg.

Alchornea javensis, Müll. Arg. in DC. Prodr., xv. 2, p. 905.

Admiralty Islands.—Malacca, Philippines, and Java. *Alchornea* comprises upwards of thirty species spread over the warmer regions of both hemispheres.

URTICACEÆ.

Ficus spp.

Admiralty Islands.—There are more or less imperfect specimens of eight or ten species of this vast genus, including perhaps some peculiar ones ; but the described Malayan species, of which we have seen no authenticated specimens, are so numerous, that we dare not venture to make any new ones.

Artocarpus incisa, Linn.

Artocarpus incisa, Linn. ; Seem., Fl. Vit., p. 255 ; Dcne., Herb. Timor. Descr., p. 169 ; Miq., Fl. Ind. Bat., i. 2, p. 285 ; Nadeaud, Enum. Pl. Tahiti, p. 44 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 121 et 147 ; Mann in Proc. Amer. Acad., vii. p. 201.

Admiralty Islands.—The Bread-fruit Tree is generally spread in the Malayan Archipelago and in Polynesia, where it was cultivated at the time of the earliest visits of Europeans ; and it is naturalised in the West Indies. It is apparently wanting in the Arrou

Islands; see note thereon, *ante*, p. 117. De Candolle, however, says[1] that the Bread-fruit Tree is evidently a native of Java, Amboina, and the neighbouring islands; but it has been cultivated from such remote times that its exact history cannot be ascertained. This view is strengthened by the fact that the Archipelago is the home of the majority of the species of *Artocarpus*, very few reaching Continental Asia, and none except the cultivated ones, *Artocarpus incisa* and *Artocarpus integrifolia*. Further, tradition suggests a period when the Bread-fruit Tree did not exist in Tahiti. Nadeaud states that the climatic conditions of the interior of this island are unfavourable to it, and the varieties growing there wild or cultivated produce no seed, whereas in Tongatabu perfect seeds are always developed. Seemann says that it is cultivated throughout the Fiji Islands, and is also in some parts to all appearances wild. On the other hand, Jouan remarks that if it be not indigenous in the Marquesas, the very least trouble is taken in its cultivation, and he never saw any save the common variety there. He also adds that on his expedition d'Entrecasteaux carried 300 plants from Tongatabu to Java, and asks whether it previously existed in the latter island; and he interprets the Tahitian traditions as indicating a spontaneous origin of the Bread-fruit Tree in the Society Islands.

Gironniera celtidifolia, Gaud.

Gironniera celtidifolia, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 223; Seem., Fl. Vit., p. 236; Weddell in DC. Prodr., xvii. p. 207.

Admiralty Islands.—Philippines and Fiji Islands, and Weddell describes a form, which he regards as a variety of this, from St. George [New Georgia?] in the Solomon Archipelago. There are also specimens in the Kew Herbarium of the same or a closely allied species from Samoa. *Gironniera* is a small genus confined to Ceylon, the Malay Peninsula and Archipelago, Southern China, and the Pacific Islands.

Pipturus argenteus, Wedd.

Pipturus argenteus, Wedd.; Benth., Fl. Austr., vi. p. 185.
Pipturus propinquus, Wedd., Monogr., p. 447, t. 15; Seem., Fl. Vit., p. 244; Miq., Fl. Ind. Bat., i. 2, p. 268.
Urtica argentea, Forst., Fl. Ins. Austr. Prodr., p. 65.

Admiralty Islands.—Malayan Archipelago, North-eastern Australia, and in Polynesia from the New Hebrides and Friendly to the Fiji and Marianne Islands.

Elatostema integrifolium, Wedd.

Elatostema integrifolium, Wedd. in DC. Prodr., xvi. 1, p. 179.
Elatostema sesquifolium, Hassk.; Miq., Fl. Ind. Bat., i. 2, p. 243.

Admiralty Islands.—Widely dispersed in India, and extending through the Archipelago. *Elatostema* is a genus of about fifty species, confined to the Old World, and chiefly to Asia and Africa.

[1] Origine des Plantes Cultivées, p. 239.

CASUARINEÆ.

Casuarina equisetifolia, Forst.

Casuarina equisetifolia, Forst.; Seem., Fl. Vit., p. 263; Nadeaud, Enum. Pl. Tahiti, p. 42; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 123, 138, 147.

Admiralty Islands.—This is now generally diffused in warm regions, chiefly in maritime districts, and in Polynesia it extends eastward to the Marquesas and northward to the Mariannes, but it does not occur in the Sandwich Islands.

MONOCOTYLEDONES.

ORCHIDEÆ.

DENDROBIUM.

Dendrobium nitidissimum, Rchb. f.

Dendrobium nitidissimum, Rchb. f. in Journ. Linn. Soc. Lond., xv. p. 112.

Nova sectio *Diplocaulobium*. Rhizomatis repentis gemmæ aliæ pseudobulbos monophyllos sistentes, aliæ pedunculos basi vaginatos, apice floridos.

Pseudobulbis fusiformi-teretiusculis, siccis multiangulatis sulcatisque monophyllis, folio lineari-ligulato attenuato bilobulo; pedunculo a pseudobulbo foliato liberrimo ex alia gemma, nitido basi vaginato ancipiti, apice bractea magna chartacea nitida, superaddita bractea minore, fatua visa; flore solitario (semper?) valde membranaceo, mento bene evoluto, lobulato, sepalis elongatis acuminatis, tepalis angustioribus, labello sepalorum dimidium excedente a basi lineari extenso, medio trifido, laciniis lateralibus obtusangulis antice lobulatis, lacinia media late ligulate lobulata, carinis geminis a basi versus discum laciniæ mediæ, ibi melius crispato-lobulatis, antice in pilos numerosissimos tomentum densum efficientibus solutis, columnæ androclinio trifido, laciniis membranaceis.

Floris perigonium quasi rostriforme illi *Thrixspermi* cujusdam (*Arachnitis*, etc.) comparabile, ¾ pollicis longum, delicatissimum, tenuissimum. Plantula valde egregia dignitate gemmarum varia insignis. *Macrolepidi*, A. Rich. eo comparabilis, quod rhachis sub bractea incisa quodammodo articulata. Labellum *Macrolepidis* tamen exacte est illud *Bulbophyllosum*.

Admiralty Islands.—Endemic.

Dendrobium scopa, Lindl. var.

Dendrobium scopa, Lindl. var.; Rchb. f. in Walp. Ann., vi. p. 303.

Admiralty Islands.—Also in the Philippine Islands.

Agrostophyllum longifolium, Rchb. f.

Appendicula longifolia, Blume; Miq., Fl. Ind. Bat., iii. p. 704.

ADMIRALTY ISLANDS.—Also in the Kew Herbarium from Sumatra and Java. The genus comprises only about half-a-dozen species, which inhabit India and the Archipelago. Bentham and Hooker (Gen. Plant., iii. p. 517) suggest that *Agrostophyllum megalurum*, Rchb. f. (in Seem. Fl. Vit., p. 296) belongs to a different genus, so that this would be the only one known from Polynesia.

Thelasis triptera, Rchb. f.

Thelasis triptera, Rchb. f. in Bonplandia, 1855, p. 119.

ADMIRALTY ISLANDS.—Also from the Philippines. Of this genus about eight species are known, and they are restricted to the warmer parts of Asia.

Tropidia effusa, Rchb. f.

Tropidia effusa, Rchb. f. in Seem. Fl. Vit., p. 295.

ADMIRALTY ISLANDS.—Not known to us elsewhere except from the Fiji Islands. *Tropidia* is a genus of about half-a-dozen species inhabiting India, the Archipelago, and Polynesia.

Phreatia sp.

ADMIRALTY ISLANDS.—Specimen insufficient for specific determination. *Phreatia* is a small genus confined to the tropics of the Old World.

SCITAMINEÆ.

Clinogyne grandis, Benth.

Clinogyne grandis, Benth. et Hook. f., Gen. Plant., iii. p. 651.
Maranta grandis, Miq., Fl. Ind. Bat. Suppl., p. 616.

ADMIRALTY ISLANDS.—Malayan Peninsula and Archipelago, from the Philippines to the Arrou Islands.

AMARYLLIDEÆ.

Crinum asiaticum, Linn.

Crinum asiaticum, Linn.; Benth., Fl. Austr., vi. p. 454; Seem., Fl. Vit., p. 305; Miq., Fl. Ind. Bat., iii. p. 580; Baker, Fl. Maurit., p. 366; Moseley in Journ. Linn. Soc. Lond., xv. p. 76.

ADMIRALTY ISLANDS.—This conspicuous herbaceous, bulbous plant is common on the sandy sea-shores of Tropical Asia and Australia, extending in Polynesia to the Fiji, and perhaps also to the Tongan Islands. *Crinum* numbers about sixty species, spread over the

tropics of both hemispheres, many of them being littoral plants. *Crinum asiaticum* is naturalised in the Mauritius. By an oversight this is omitted in the enumeration of the plants from the South-eastern Moluccas, though, according to Moseley, it was abundant on the shores of the Arrou Islands.

TACCACEÆ.

Tacca pinnatifida, Forst.

Tacca pinnatifida, Forst., Char. Gen. Plant., p. 70, t. 35, et Pl. Escul. Ins. Oceani Austr., p. 59, *excl. syn.* Rumphii, *fide* Seem., Fl. Vit., p. 102; Benth., Fl. Austr., vi. p. 458; Nadeaud, Enum. Pl. Tahiti, p. 35; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 130 et 145; Mann in Proc. Amer. Acad., vii. p. 205.

Admiralty Islands.—Tropical Asia, Africa, and Australia, and common almost throughout Polynesia, where it grows both wild and cultivated. According to Seemann it is a common seashore plant in the Fijis. Jouan states that it is comparatively rare in the Marquesas, and he suspects that it is a colonist.

PALMÆ.

Cocos nucifera, Linn.

Cocos nucifera, Linn.; Seem., Fl. Vit., p. 275; Benth., Fl. Austr., vii. p. 143; Nadeaud, Enum. Pl. Tahiti, p. 40; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 127, 136, et 147; Mann in Proc. Amer. Acad., vii. p. 204.

Admiralty Islands.—Now very widely spread in tropical regions, especially in maritime districts. See remarks on p. 203. Mr Moseley (Journ. Linn. Soc. Lond., xv. p. 78) states that he saw altogether five species of palm in the Admiralty Islands; namely, the cocoa-nut, the sago, a species of *Areca*, a *Caryota*, and a small fan palm. No Rattan (*Calamus*) was seen growing, but rattan cables were used by the islanders. *Nipa* does not appear to reach these islands, but Dr Guppy has lately collected it in the Solomon Islands.

PANDANEÆ.

Pandanus spp., Moseley.

Pandanus spp., Moseley in Journ. Linn. Soc. Lond., xv. pp. 76 et 79.

Admiralty Islands.—The smallest fragment is usually sufficient to indicate the genus *Pandanus*, but the full material necessary to define the species is wanting in our botanical collections for a large number of them. Mr Moseley observed three species of *Pandanus* in the Admiralty Islands, and he collected specimens of two, one of them quite a miniature and probably undescribed. He further states (*loc. cit.*, p. 79), that the three species met with are identical with the three found in the Arrou Islands.

AROIDEÆ.

Pothos rumphii, Schott var. ?

Pothos rumphii, Schott var. ? DC., Monogr. Phanerog., ii. p. 89.
Scindapsus rumphii, Presl, Epim., p. 241 ; Miq., Fl. Ind. Bat., iii. p. 185.

ADMIRALTY ISLANDS.—The specimens of this aroid are excellent, but we have only seen a single imperfect specimen of *Pothos rumphii*, which is from Java. It is a more robust plant than the present, and the two may be distinct species.

Pothos sp.

ADMIRALTY ISLANDS.—Barren branches of an extremely slender species with small leaves. It belongs to the group having winged petioles as large as, or larger than the blade. The same species, in the same condition, was collected in New Guinea.

CYPERACEÆ.

Hypolytrum latifolium, Rich.

Hypolytrum latifolium, Rich. ; Benth., Fl. Austr., vii. p. 339 ; Seem., Fl. Vit., p. 317.

ADMIRALTY ISLANDS.—Widely dispersed in Tropical Asia and Africa; also occurring in North-eastern Australia, and in Polynesia it extends eastward to the Fiji Islands. A very closely allied species inhabits Tropical America.

Scleria sumatrensis, Retz ?

Scleria sumatrensis, Retz ? Miq., Fl. Ind. Bat., iii. p. 343.

ADMIRALTY ISLANDS.—The specimen is very young, and may not belong to this species.

GRAMINEÆ.

Oplismenus compositus, Beauv.

Oplismenus compositus, Beauv.; Benth., Fl. Austr., vii. p. 491 ; Nadeaud, Enum. Pl. Tahiti, p. 31.
Orthopogon compositus, R. Br. ; Miq., Fl. Ind. Bat., iii. p. 443.

ADMIRALTY ISLANDS.—Generally spread in warm countries, including Polynesia, eastward to Pitcairn and the Sandwich Islands. Of this genus there are several other widely diffused species, the numerous forms of which are very difficult of classification.

Ischæmum muticum, Linn.

Ischæmum muticum, Linn. ; Benth., Fl. Austr., vii. p. 520.

ADMIRALTY ISLANDS.—Widely spread in Tropical Asia and Western Polynesia, and also found on the north-eastern coast of Australia. The genus is a considerable one, most of the species being Asiatic or African, though a few are found in America.

Centotheca lappacea, Desv.

Centotheca lappacea, Desv.; Benth., Fl. Austr., vii. p. 640; Seem., Fl. Vit., p. 322; Nadeaud, Enum. Pl. Tahiti, p. 32.
Poa latifolia, Forst., Fl. Ins. Austr. Prodr., p. 8.

Admiralty Islands.—A monotype spread nearly all over Tropical Asia, Africa, and Polynesia, and it has also been collected in North-eastern Australia.

GYMNOSPERMEÆ.

CYCADEÆ.

Cycas circinalis, Linn.

Cycas circinalis, Linn.; Seem., Fl. Vit., p. 268; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 147.

Admiralty Islands.—Tropical Asia, Africa, and Western Polynesia.

CRYPTOGAMÆ.—VASCULARES.

FILICES.

Cyathea moseleyi, Baker.

Cyathea moseleyi, Baker in Journ. Linn. Soc. Lond., xv. p. 104.

Frond ample, pinnate. Rachises brown, those of the pinnæ ciliated on the upper side, naked on the lower. Pinnæ oblong-lanceolate, 1½ feet by 5–6 inches. Pinnules sessile, ligulate-lanceolate, 2¼ to 3 inches long, ⅝ to ¾ inch broad, cut down to the rachis into subentire, blunt, slightly curved, tertiary segments which are 2 lines broad. Texture moderately firm. Upper surface naked; lower with many minute, deltoid, bullate scales on the midrib of the veins. Veins 8–10-jugate, ascending, distinct, all but the uppermost forked. Sori 8–10 to a segment, median, placed in a distinct space from both edge and midrib, and with a distinct space between each. Involucre large, membranous, persistent, with a regularly truncate margin.

Admiralty Islands.—Nearest the Fijian and Samoan *Cyathea propinqua*, Mett.

Hymenophyllum (Leptocionium) polyodon, Baker.

Hymenophyllum (Leptocionium) polyodon, Baker in Journ. Linn. Soc. Lond., xv. p. 105.

Rhizome wide-creeping, filiform, lanose. Stipes ¾ to 2 inches, filiform, flexuose, fibrillose. Lamina lanceolate, tri-pinnatifid, 2–3 inches long, ½ to 1 inch broad. Pinnæ 8–12-jugate, rhomboid or lanceolate-rhomboid, parallel with the rachis on the upper side at the base, cuneate-truncate on the lower side, the central ones the largest, ¼ inch broad at the middle, the lower ones reduced. Ultimate segments 10–15 to a pinna, ligulate, close, ½ to 1 line

long, bordered by regular, numerous, minute teeth. Sori one to each pinna, terminal on a side segment of the lowest anterior pinnule. Involucre turbinate, a line deep, the very base immersed in the lamina; valves toothed at the edge, free nearly to the base; receptacle exserted.

ADMIRALTY ISLANDS. — Intermediate between *Hymenophyllum tunbridgense* and *Hymenophyllum multifidum.*

Trichomanes motleyi, Van den Bosch.

Trichomanes motleyi, Van den Bosch; Hook. and Bak., Synopsis Fil., p. 73; Baker in Journ. Linn. Soc. Lond., xv. p. 105.

ADMIRALTY ISLANDS.—This species is found in Ceylon, Moulmein, the Andamans, Borneo, and New Caledonia, and Mr Baker informs us that *Hymenophyllum cognatum,* Cesati, from New Guinea, is typical *Hymenophyllum motleyi,* and *Hymenophyllum pannosum,* Cesati, from the same country, is a large variety.

Trichomanes peltatum, Baker.

Trichomanes peltatum, Baker in Journ. Linn. Soc. Lond., ix. p. 336, t. 8, et xv., p. 105; Hook. and Bak., Synopsis Fil., p. 73; Benth., Fl. Austr., vii. p. 701.

ADMIRALTY ISLANDS.—This remarkable fern was first discovered in Samoa and subsequently in New Caledonia and Queensland.

Trichomanes humile, Forst.

Trichomanes humile, Forst.; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 80.

Trichomanes erectum, Brackenr. in Bot. U.S. Expl. Exped., i. p. 250, t. 36; Seem., Fl. Vit., p. 343.

ADMIRALTY ISLANDS.—This species ranges from New Zealand through Polynesia to the Sandwich Islands and the Philippines and Java, but it is not recorded from Australia. It is, however, very closely allied to the widely spread *Hymenophyllum pyxidiferum.*

Trichomanes filicula, Bory.

Trichomanes filicula, Bory; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 81; Seem., Fl. Vit., p. 344.

ADMIRALTY ISLANDS.—Very common and widely dispersed in Tropical and Subtropical Asia and Africa, and extending in Polynesia eastward to Tahiti. It is also found in New Caledonia and New Guinea, though hitherto not in Australia.

Trichomanes javanicum, Blume.

Trichomanes javanicum, Blume; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 83; Benth., Fl. Austr., vii. p. 702.

ADMIRALTY ISLANDS.—North-eastern Australia, and Samoa northwards, through the

Archipelago to the Himalayas, and westward to Madagascar. There are also specimens in the Kew Herbarium from the Solomon Islands and the New Hebrides, but not from the Fijis.

Davallia elegans, Swartz.

Davallia elegans, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Benth., Fl. Austr., vii. p. 715.

ADMIRALTY ISLANDS.—Widely diffused in Tropical Asia, Africa, Australia, and Polynesia, where it extends eastward to Harvey Island and Tahiti.

Lindsaya lobata, Poir.

Lindsaya lobata, Poir.; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Hook. and Bak., Synopsis Fil., p. 111; Benth., Fl. Austr., vii. p. 720.

ADMIRALTY ISLANDS.—North-eastern Australia to Samoa and the Fijis, and the Malayan Archipelago to Southern India. Baker unites *Lindsaya billardieri*, *Lindsaya pulchra*, *Lindsaya harveyi*, and *Lindsaya seemanni*, Carruthers (Seem., Fl. Vit., pp. 337 et 338) with this.

Asplenium nidus, Linn.

Asplenium nidus, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Benth., Fl. Austr., vii. p. 744; Seem., Fl. Vit., p. 353.

ADMIRALTY ISLANDS.—Very widely spread in the warmer parts of the Old World, and in Polynesia ranging from New Caledonia to Mangaia, Tahiti, Elisabeth Island, and the Sandwich Islands. It inhabits the islands of the Indian Ocean, including Madagascar, Johanna, the Seychelles, and Diego Garcia, Chagos Archipelago, but not Continental Africa.

Asplenium falcatum, Lam.

Asplenium falcatum, Lam.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Benth., Fl. Austr., vii. p. 746; Seem., Fl. Vit., p. 354.

ADMIRALTY ISLANDS.—This species ranges from New Zealand to India and Africa, and in Polynesia it extends to the Fijis, Samoa, and Tongatabu. Recently, too, Mr Jenman has sent a specimen of a fern from Jamaica, which is not distinguishable from this.

Asplenium cuneatum, Lam.

Asplenium cuneatum, Lam.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Hook. and Bak., Synopsis Fil., p. 214; Seem., Fl. Vit., p. 355.

ADMIRALTY ISLANDS. — A common Tropical American species, also found in South and Tropical Africa, the Mascarene Islands, Hong Kong, Java, and other parts of the Malayan Archipelago; the other Polynesian localities represented in the Kew Herbarium are the Fijis and the Sandwich Islands.

Asplenium (Diplazium) brackenridgei, Baker.

Asplenium (Diplazium) brackenridgei, Baker in Hook and Bak. Synopsis Fil., p. 234, et in Journ. Linn. Soc. Lond., xv. p. 107.
Diplazium tenerum, Presl; Seem., Fl. Vit., p. 356.

ADMIRALTY ISLANDS.—This is also represented in the Kew Herbarium from the Samoan, Fiji, Solomon, and Philippine Islands.

Asplenium (Anisogonium) esculentum, Presl.

Asplenium (Anisogonium) esculentum, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Hook. and Bak., Synopsis Fil., p. 244.
Asplenium (Diplazium) vitiense, Baker; Seem., Fl. Vit., p. 357.

ADMIRALTY ISLANDS.—North-east Australia to Formosa, China, and the Himalayas, and eastward in Polynesia to the Fijis and Samoa. This species is not included in Bentham's Flora Australiensis, but a specimen in the Kew Herbarium, from Rockingham Bay, named *Asplenium polypodioides* by Mueller, is it, Mr Baker tells us.

Nephrodium molle, Desv.

Nephrodium molle, Desv.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Benth., Fl. Austr., vii. p. 756 (*sub Aspidio*).
Nephrodium nymphale, Carruthers in Seem. Fl. Vit., p. 363.

ADMIRALTY ISLANDS.—One of the most generally diffused ferns in tropical and sub-tropical regions.

Nephrodium truncatum, Presl.

Nephrodium truncatum, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Benth., Fl. Austr., vii. p. 756; Seem., Fl. Vit., p. 363.

ADMIRALTY ISLANDS.—North-eastern Australia to the Philippines and the Himalayas; the Mascarene and Comoro Islands, and very common in Polynesia, from New Caledonia to the Fiji, Society, and Sandwich Islands.

Nephrolepis acuta, Presl.

Nephrolepis acuta, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Seem., Fl. Vit., p. 361.

ADMIRALTY ISLANDS.—A very widely spread species, common in Polynesia, from New Caledonia to Maingaia, the Society, and the Pelew Islands. Although not included in the Flora Australiensis, there are numerous Australian specimens in the Kew Herbarium bearing this name.

Nephrolepis exaltata, Schott.

Nephrolepis exaltata, Schott; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Benth., Fl. Austr., vii. p. 754.

ADMIRALTY ISLANDS.—Generally diffused in most warm countries; in Polynesia it ranges from New Caledonia to the Society, Ellice, and Sandwich groups.

Polypodium (Eupolypodium) decorum, Brack.

Polypodium (*Eupolypodium*) *decorum*, Brack.; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Hook. and Bak., Synopsis Fil., p. 331.

Admiralty Islands.—Ceylon, Malayan Peninsula and Archipelago, and in Polynesia eastward through the Fijis and Samoan Islands to Tahiti, and northward to the Sandwich group.

Polypodium (Niphobolus) adnascens, Swartz.

Polypodium (*Niphobolus*) *adnascens*, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Seem., Fl. Vit., p. 367 (*sub Niphobolo*).

Admiralty Islands.—Spread nearly all over the warmer parts of Asia; also occurring in Western Tropical Africa; and in Polynesia it extends eastward through the Fijis to the Society Islands.

Polypodium (Phymatodes) irioides, Poir.

Polypodium (*Phymatodes*) *irioides*, Poir.; Baker in Journ. Linn. Soc. Lond., xv. p. 109; Benth., Fl. Austr., vii. p. 771.
Pleopeltis irioides, T. Moore; Seem., Fl. Vit., p. 367.

Admiralty Islands.—North-eastern Australia to Chusan and North India, the Mascarene Islands, and West Africa; in Polynesia it ranges from New Caledonia to the Fijis and Tahiti.

Polypodium (Phymatodes) linguæforme, Mett.

Polypodium (*Phymatodes*) *linguæforme*, Mett.; Baker in Journ. Linn. Soc. Lond., xv. p. 109; Hook. and Bak., Synopsis Fil., p. 358.

Admiralty Islands.—Also from Amboina, New Guinea, the Solomon and Fiji Islands.

Polypodium (Phymatodes) rampans, Baker.

Polypodium (*Phymatodes*) *rampans*, Baker in Journ. Linn. Soc. Lond., xv. p. 109.

Rhizome very wide-creeping, ½ line thick, clothed only with a few minute, adpressed, linear, dark-brown scales. Stipes naked, very short. Lamina simple, lanceolate-ligulate, 4–6 inches long, ¾ to 1¼ broad at the middle, acute, narrowed gradually to the ends, membranous, both surfaces quite naked. Main veins erecto-patent two-thirds of the way to the edge, then uniting in an arch; areolæ rather large, very distinct, each with an included knobbed free veinlet. Sori not present.

Admiralty Islands.—A next neighbour to *Polypodium lycopodioides*.

Polypodium phymatodes, Linn.

Polypodium phymatodes, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 110; Benth., Fl. Austr., vii. p. 769.
Pleopeltis phymatodes, T. Moore; Seem., Fl. Vit., p. 368.

Admiralty Islands.—Widely spread in the tropics of the Old World, and ranging in Polynesia from New Caledonia to the Fijis and Tahiti.

Polypodium (Phymatodes) nigrescens, Blume.

Polypodium (Phymatodes) nigrescens, Blume; Baker in Journ. Linn. Soc. Lond., xv. p. 110; Benth., Fl. Austr., vii. p. 769.

Admiralty Islands.—North-eastern Australia to the Malayan Peninsula and the Philippines, and eastward in Polynesia to the Fijis and Samoa and Savage Islands, in the Navigators' group.

Vittaria elongata, Swartz.

Vittaria elongata, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 718.
Vittaria rigida, Kaulf.; Seem., Fl. Vit., p. 372.

Admiralty Islands.—Eastern Australia to the Himalayas, Mascarene Islands, the warmer parts of Africa; and throughout Polynesia from New Caledonia to Tahiti, the Sandwich and Marianne Islands.

Acrostichum (Stenochlæna) scandens, J. Sm.

Acrostichum (Stenochlæna) scandens, J. Sm.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 778; Seem., Fl. Vit., p. 373.

Admiralty Islands.—North-eastern Australia to the Himalayas, and eastward in Polynesia to the Fijis and Samoa.

Acrostichum (Gymnopteris) repandum, Blume.

Acrostichum (Gymnopteris) repandum, Blume, var. *quoyanum*, Gaud.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 779.

Admiralty Islands.—North-eastern Australia to China and the Philippines, Mascarene Islands, and in Polynesia eastward to the Fijis and Samoa, and southward to New Caledonia.

Acrostichum (Photinopteris) thomsoni, Baker.

Acrostichum (Photinopteris) thomsoni, Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Fronds subsessile, membranous, glabrous, the barren part lanceolate, 2–3 feet long, 6–8 inches broad, cut down to a broad wing into lanceolate or deltoid lobes; those of the

centre of the frond 2–3 inches deep, $1\frac{1}{2}$–2 inches broad at the base, erecto-patent, narrowed gradually to an acute point; those near the base more shallow. Pinnæ each with a distinct costa and erecto-patent main veins 3–4 lines apart, distinct to the edge, connected by several distinct cross-bars, as in *Campyloneuron;* the final areolæ quadrate, minute, furnished with copious, knobbed, free, included venules. Fertile portion of the frond extending over the upper half-foot of the rachis, which bears about twenty pairs of subulate lomarioid pinnæ $1\frac{1}{2}$ – 2 inches long. Rachis brown-stramineous. Both surfaces quite destitute of hairs and scales.

Admiralty Islands.—Of known species only near *Acrostichum drynarioides*, from which it differs in its membranous texture and much smaller size.

Lygodium dichotomum, Swartz.

Lygodium dichotomum, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Hook. and Bak., Synopsis Fil., p. 437.

Admiralty Islands.—Throughout the Malayan Archipelago, South India, and South China; and besides the Admiralty Island specimens there is another in the Kew Herbarium from Polynesia, but without any more definite locality.

Ophioglossum pendulum, Linn.

Ophioglossum pendulum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 689; Seem., Fl. Vit., p. 378.

Admiralty Islands.—Eastern Australia to the Philippines, Assam, Ceylon, and the Mascarene Islands, and eastward in Polynesia to Tahiti and the Sandwich Islands.

LYCOPODIACEÆ.

Lycopodium cernuum, Linn.

Lycopodium cernuum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 676; Seem., Fl. Vit., p. 328.

Admiralty Islands.—This is spread nearly all over the tropics, both in America and in the Old World, including New Zealand and Polynesia, from the New Hebrides to Tahiti and the Sandwich and Marianne groups. It also occurs in the Azores.

Selaginella canaliculata, Baker.

Selaginella canaliculata, Baker in Journ. Bot., 1885, p. 21.
Selaginella inæqualifolia, Baker in Journ. Linn. Soc. Lond., xv. p. 112, *non* Spring, *fide* Bakeri.

Admiralty Islands.—Generally dispersed in Tropical Asia, including Western Polynesia.

Psilotum triquetrum, Linn.

Psilotum triquetrum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 112; Benth., Fl. Austr., vii. p. 681; Seem., Fl. Vit., p. 331.

Admiralty Islands.—Spread over nearly all tropical and subtropical regions, including the most remote islands of Polynesia.

Psilotum complanatum, Swartz.

Psilotum complanatum, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 112; Benth., Fl. Austr., vii. p. 685.

Psilotum flaccidum, Wall.; Seem., Fl. Vit., p. 330.

Admiralty Islands.—This species is as generally diffused in Polynesia as *Psilotum triquetrum*, and nearly as widely in other parts of the world, except that it does not appear to reach Africa, though common in the Mascarene Islands.

CRYPTOGAMÆ.—CELLULA ES.

MUSCI.[1]

Octoblepharum (Arthrocormus) schimperi, Mitt.

Arthrocormus schimperi, Dozy et Molk., Musc. Frond. Arch. Ind., p. 76, t. 27, et Bryol. Jav., p. 25.

Admiralty Islands.—Fine specimens, though barren. Amboina to Borneo and the Philippines.

Octoblepharum (Arthrocormus) incrassatum, Mitt.

Octoblepharum (*Arthrocormus*) *incrassatum*, Mitt. in Seem. Fl. Vit., p. 386, t. 98, fig. g.

Admiralty Islands.—Barren; its fruit is as yet unknown. Described from Samoan specimens.

All the species of this group, and about ten are certainly known to belong to it, have the leaves more or less distinctly tristichous in their insertion, and are composed almost entirely of an incrassated trigonous nerve, thus differing from the structure of the leaf in the typical *Octoblepharum albidum*, where the incrassated nerve is flattened; and there is no trace in the upper portion of the pagina of the leaf of a marginal limb, which is more or less evident among the species allied to *Octoblepharum schimperi*, as well as to those agreeing with *Octoblepharum densifolium* and *Octoblepharum squarrosum* (*Leucophanes*), Brid. Bryol. Univ., i. p. 764 = *Syrrhopodon candidus*, Schwägr., t. 183 = *Leucophanes reinwardtianum*, C. Müll., Synopsis Musc. Frond., i. p. 82, Dozy et Molk., Bryol. Jav., t. 16, which have the dilated nerve so thin that its small medial carina is easily

[1] By William Mitten, A.L.S.

mistaken for the nerve itself; the true pagina of the leaf, as in the *Leucobryæ*, being in all these mosses distinguishable for the most part only at the base.

The genus *Leucophanes* was founded by Bridel on *Leucophanes octoblepharoides*, *Leucophanes squarrosum*, and *Leucophanes fragile*; its essential character being the sixteen teeth of the peristome, which distinguished it from *Octoblepharum* as then known. Now, however, with species closely resembling *Octoblepharum albidum*, except in having sixteen teeth in their peristome, it is evident that the eight teeth in *Octoblepharum albidum* are but coherent pairs of the normal number of peristomial teeth, analogous instances of which occur in *Orthotrichum*, and therefore any distinction on this character is of small value.

Octoblepharum (Leucophanes) octoblepharoides, Mitt.

Leucophanes octoblepharoides, Brid., Bryol. Univ., i. p. 763; C. Müll., Synopsis Musc. Frond., i. p. 82.

Admiralty Islands.—Small barren stems, scattered among other mosses. India, and throughout the Malayan Archipelago.

Octoblepharum (Leucophanes) densifolium, Mitt.

Octoblepharum (*Leucophanes*) *densifolium*, Mitt. in Bonplandia, 1861, p. 366.

Admiralty Islands.—Also found in the Fijis.

Growing in large tufts on trees overhanging the sea. Similar to *Octoblepharum squarrosum* in size, but the foliage is not divaricate.

Octoblepharum (Leucophanes) smaragdinum, Mitt.

Octoblepharum (*Leucophanes*) *smaragdinum*, Mitt. in Bonplandia, 1861, p. 366.

Admiralty Islands.

The fruit of this is not yet known; the species is found in the Samoan, Solomon, and Fiji Islands, in the Ellice group, in Palmerston Island, and also in the Philippines. The description of *Leucophanes albescens*, C. Müll. in Bot. Zeit., 1864, p. 347, appears to indicate another similar or perhaps the same species; but its particularly distinctive character as given—Folia siccitate crispatula nervo validissimo oculis nudis nitore jam distincto robusta—scarcely agrees with a moss with foliage, very slightly or not at all contorted, each leaf being straight in direction, but twisted and with the carina prominent, the whole upper portion being only of two strata of cells.

This is not enumerated by C. Müller in his list of the Samoan and Vitian species, but he describes three others, which brings up his number to the same as that included in the Flora Vitiensis, and he divides the species in the following manner, considering all the species, with the exception of *Arthrocormus dentatus*, as a species of *Leucophanes*:—*Trachynotus*, containing *Octoblepharum asperum* and *Octoblepharum scabrum*; *Leionotus*, con-

taining *Octoblepharum recurvum* and *Octoblepharum tetensi*, and *Tropinotus*, containing *Octoblepharum albovirens*, and *Octoblepharum vitianum*.

The section *Trachynotus*, composed as above, is therefore not different from *Arthrocormus;* and *Leionotus* is exactly the original *Leucophanes*. The group is placed between Sphagnaceæ and Fissidenteæ, and is thus isolated. When more is known respecting the species hitherto seen only barren, it may be found that their nearest affinity is with *Syrrhopodon*, from which it is even now not very easy to distinguish some species allied to *Syrrhopodon tristichus*.

Syrrhopodon (Orthotheca) croceus, Mitt.

Syrrhopodon (*Orthotheca*) *croceus*, Mitt. in Journ. Linn. Soc. Lond., iii. Suppl. p. 41.

Admiralty Islands.—A form having short stems, bearing a few old capsules.

Occasionally specimens of this are found nearly four inches high; it appears to be widely spread in the Pacific, and is found in Ceylon. Müller, not having seen the fruit nor calyptra of this moss, has placed it in *Calymperes*.

Syrrhopodon (Eusyrrhopodon) albovaginatus, Schwägr.

Syrrhopodon (*Eusyrrhopodon*) *albovaginatus*, Schwägr., Suppl., t. 131; C. Müll., Synopsis Musc. Frond., i. p. 541.

Admiralty Islands.—Specimens bearing very young fruit. Also in the Isle of Pines, Fiji, Samoa, &c.

This well-marked species is easily recognised by its leaves being divergent with a considerable interval between them, a character but little altered when they are dry. The *Syrrhopodon græffeanus*, C. Müll. in Journ. Mus. Godef., is *Syrrhopodon lævigatus*, Mitt., in Seem. Fl. Vit., p. 389.

Syrrhopodon (Eusyrrhopodon) ciliatus, Schwägr.

Syrrhopodon (*Eusyrrhopodon*) *ciliatus*, Schwägr., Suppl., t. 130; C. Müll., Synopsis Musc. Frond., i. p. 544.

Weisia ciliata, Hook., Musc. Exot., t. 171.

Admiralty Islands.—In very small quantity, but bearing fruit. It also inhabits various islands of the Malayan Archipelago.

Calymperes dozyanum, Mitt.

Calymperes dozyanum, Mitt. in Journ. Linn. Soc. Lond., iii. Suppl. p. 42.

Calymperes moluccense, Dozy et Molk., Bryol. Jav., i. p. 47, t. 37, *non* Schwägr.

Admiralty Islands.—A well-fruited specimen.

This species is found also in Samoa, Java, the Philippines, and Ceylon. It is very different from *Calymperes moluccense* in its more spathulate leaves, not dilated above the

base, and in the entire absence of the limbation which is always present in that species. C. Müller considers the Samoan specimens distinct, and has described them as *Calymperes obliquatum*. He did not see the complete state in fruit, but relies on the nerve being shining, a character not obvious in the specimens collected by the Rev. T. Powell. The same author, too, not having seen the fruit of *Calymperes taitense* (*Syrrhopodon*, Sull.), has no hesitation in returning it to the *Orthotheca* section of *Syrrhopodon*; yet its fruit proves it to be a true *Calymperes*.

Neckera gracilenta, Van den Bosch et Lac.

Neckera gracilenta, Van den Bosch et Lac.; Dozy et Molk., Bryol. Jav., ii. p. 62, t. 182.

Admiralty Islands.—Small barren specimens.

This moss, of which all the specimens are without fruit, appears to belong to that group of species which agree in fructification with *Neckera disticha*; but until complete specimens are found, its exact position must be doubtful. Closely similar specimens both in size and colour come from Java, Borneo, and the Pacific Islands.

Sematophyllum (Rhaphidorrhynchum) cirrhifolium, Mitt.

Hypnum cirrhifolium, Schwägr. in Freycinet Voy. Bot., i. p. 129; C. Müll., Synopsis Musc. Frond., ii. p. 281.
Leskea cirrhifolia, Schwägr., Suppl., t. 290.

Admiralty Islands.—A few fragments only, agreeing with Gaudichaud's specimens collected in the Moluccas.

Ectropothecium inflectens, Mitt.

Hypnum inflectens, C. Müll., Synopsis Musc. Frond., ii. p. 239.
Ectropothecium fuscescens, Mitt. in Journ. Linn. Soc. Lond., x. p. 180.
Hypnum fuscescens, Hook. et Arn., Bot. Beech. Voy., p. 76, t. 19.

Admiralty Islands.—In a barren state. Australia and Polynesia.

C. Müller (in Journ. Mus. Godef.) enumerates this species as *Hypnum* (*Vesicularia*) *inflectens*, Brid., and this is probably a correct reference to Bridel's *Leskea* (*Omalia*) *inflectens*, Bryol. Univ., ii. p. 331, but the *Hypnum inflectens*, Brid., *loc. cit.*, p. 449, came from Hispaniola, and is doubtless quite distinct.

This species varies greatly in appearance, and, like its near allies, is uncertain in its expansion after being dried.

Pelekium velatum, Mitt.

Pelekium velatum, Mitt. in Journ. Linn. Soc. Lond., x. p. 176, et in Seem. Fl. Vit., p. 400.
Lorentzia longirostris, Hampe in Nuov. Giorn. Bot. Ital., iv. p. 288.

Admiralty Islands.—Small specimens on rotten wood. Borneo and Samoa.

In favourable conditions this forms very extensive patches, and in the absence of fruit it exactly resembles the smaller species of *Thuidium*.

Thuidium plumulosum, Mitt.

Hypnum plumulosum, Dozy et Molk. in Ann. Sci. Nat., 1844, p. 308 ; C. Müll., Synopsis Musc. Frond., ii. p. 486.

Admiralty Islands.—Barren stems. Widely diffused in the Malayan Archipelago.

A very elegant moss, in its diœcious inflorescence and general appearance most similar to the section of the genus containing the larger species ; but its seta is rough, a character otherwise confined to the section containing the smaller and monœcious forms.

HEPATICÆ.[1]

Plagiochila longispica, Mitt.

Plagiochila longispica, Mitt. in Seem. Fl. Vit., p. 407.

Admiralty Islands.—Elsewhere only from Samoa.

The specimens entirely agree with those from Samoa, with the exception of one tuft of male stems, on which the apices of the saccate leaflets enclosing the antheridia are slightly toothed ; all the other specimens, like those from Samoa, have this portion entire. The spikelets of the male inflorescence vary from one or two to three, and these are simple and much elongated (2 cm.), or they are dichotomous and even trichotomous, with the divisions divaricate, and disposed in fan-shaped order. Unlike the Samoan *Plagiochila auriculata*, Mitt., *loc. cit.*, p. 408, which is closely allied to *Plagiochila blepharophora*, Nees ab E., and *Plagiochila bantamensis*, *ejusd.* Syn. Hep., p. 39, *Plagiochila longispica* in its habit and appearance is much more like the West Indian *Plagiochila macrostachya*, yet in stature it is much smaller, and it is a true member of the small section with cucullate ventral angles to the leaves.

Chiloscyphus coalitus, Nees.

Chiloscyphus coalitus, Nees in G. L. et N. Synopsis Hepat., p. 180 ; Mitt. in Seem. Fl. Vit., p. 409. *Jungermannia coalita*, Hook., Musc. Exot., t. 123.

Admiralty Islands.

In a barren state ; fertile specimens are uncommon, and it is quite impossible to be sure that some specimens referred to this species on account of their leaves being combined in the same manner with the amphigastrium are truly identical, or if they are species of *Lophocolea* with the same arrangement, the similarity being very close in size and form.

[1] By William Mitten, A.L.S.

Bryopteris fruticosa, Lindb. et Gottsche.

Bryopteris fruticosa, Lindb. et Gottsche in G. L. et N. Synopsis Hepat., p. 737.
Bryopteris vittata, Mitt. in Seem. Fl. Vit., p. 411.

ADMIRALTY ISLANDS.

Very large, with many elegant fronds, and with a few perfect perianths. The band of enlarged cells in the middle of the leaf renders this species easily distinguishable from *Bryopteris sinclairii*, which is in other respects very similar, and these species in their perianths with three principal carinæ correspond to the South American *Bryopteris filicina*; but in both *Bryopteris fruticosa* and *Bryopteris sinclairii* the lateral branches are much shorter, so that the outline of the frond-like principal branches is always narrower. That group of species of which *Ptychanthus striatus* is the type differs in no other respect from *Bryopteris* except in the more numerous folds of the perianth, and in this particular is analogous to those *Frullaniæ* which have multiplicate perianths, but which on this account have not been separated from that genus.

Lejeunia sordida, Nees.

Lejeunia sordida, Nees in G. L. et N. Synopsis Hepat., p. 367, *β*.

ADMIRALTY ISLANDS.—The typical plant inhabits Java, the Philippines, and the var. *β* is also found in the Marianne Islands.

The perianth is elongate cylindraceous below, above the middle equally five plicate, the apex obtuse; the involucral leaves similar to the cauline.

Frullania gaudichaudi, Nees et Mont.

Frullania gaudichaudi, Nees et Mont.; G. L. et N., Synopsis Hepat., p. 435.

ADMIRALTY ISLANDS.—Specimens bearing young perianths. This is recorded in the Synopsis from Brazil, Tasmania, and Guam in the Marianne group.

A large species with the small lobule erect, close to the stem, and so placed as to appear above the base of the ventral margin. Its inflorescence is probably dicœcious.

Frullania secundiflora, Mont.

Frullania secundiflora, Mont., Syllog. Gen. et Sp. Crypt., p. 85; G. L. et N., Synopsis Hepat., p. 433.

ADMIRALTY ISLANDS.—Also from the Philippines.

In this the lobule is small, obovate, and is so much deflexed as to appear pendulous from the margin of the leaf. The inflorescence is monœcious.

LICHENES.[1]

Collema (Dichodium) byrsinum, Acharius.

Collema (*Dichodium*) *byrsinum*, Acharius; Nyl., Synopsis Meth. Lich., i. p. 113; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On trees; well fruited. Spread almost all over the tropics, especially in maritime districts.

Ramalina subfraxinea, Nyl.

Ramalina subfraxinea, Nyl., Recog. Monogr. Ramal., p. 41; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On branches; fertile. (Spores 0·015–0·018 millim. long, 0·004–0·005 millim. thick.) Nylander records this species from New Grenada, Mauritius, Bourbon, and the Marianne Islands, but he adds that it is perhaps not specifically different from the very widely dispersed *Ramalina fraxinea*.

Pyxine sp.? Crombie.

Pyxine sp.? Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On bark; sterile and indeterminable.

Lecanora granifera, var. **leucotropa**, Nyl.

Lecanora granifera, var. *leucotropa*, Nyl., Lich. Antill. Husn., p. 11; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

(Thallus K +, yellow; spores, 0·014–0·016 millim. long, 0·007–0·010 millim. thick.)

Admiralty Islands.—On the bark of trees; a small specimen.

Opegrapha subvulgata, Nyl.

Opegrapha subvulgata, Nyl. in Flora, 1869, p. 71; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226, *formâ absita*.

Differt apotheciis interdum cæsio suffusis, sporis nonnihil turgidioribus (longit. 0·023–0·032 millim., crassit. 0·006 millim., 7-septatulis). Thallus variat maculiformis pallescens aut fuscescens. Spermogonia non visa.

Admiralty Islands.—On branches, apparently frequent.

Allied to *Opegrapha vulgata*, Acharius, a common British species widely diffused in other parts of the world.

[1] Extracted from the *Journ. Linn. Soc. Lond.*, vol. xvi., 1878, with additional references and remarks on the distribution of the species.

Arthonia polymorphoides, Nyl.

Arthonia polymorphoides, Nyl. in Journ. Linn. Soc. Lond., xvi. p. 216; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Arthonia interveniens, Stirton in Journ. Linn. Soc. Lond., xiv. p. 372, non Nyl.

Admiralty Islands.—On thin bark of trees: sparingly gathered. (Spores 0·016–0·022 millim. long, 0·006–0·007 millim. thick.)

This species was founded on Bermudan specimens collected by Mr Moseley, and these two distant localities are the only ones hitherto recorded for it.

Platygrapha stenogramma, Nyl.

Platygrapha stenogramma, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Thallus albidus subopacus tenuis lævis, tenuiter nigro limitatus; apothecia nigra lineari-elongata (latit. circiter 0·15 millim., longit. sæpius 1–2 millim.), simplicia, plus minusve flexuosa, intus albida; sporæ 8-næ aciculari-fusiformes 7–9 septatæ, longit. 0·030–0·035 millim., crassit. 0·004 millim., paraphyses irregulares graciles, hypothecium incolor. Iodo gelatina hymenialis dilute vinose rubescens.

Species apotheciis elongatis thallino-obductis (epithecio solo nudo) bene distincta, facie fere *Graphidis pavonianæ*. Spermatia arcuata, longit. 0·018–0·023 millim., crassit. 0·0005 millim.

Admiralty Islands.—On the bark of trees; probably not uncommon.

Graphis scripta, Acharius.

Graphis scripta, Acharius; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226 (*forma pulverulenta*).

Admiralty Islands.—On the bark of trees; sufficiently typical.

This common British lichen is spread nearly all over the world.

Graphis dendrogramma, Nyl.

Graphis dendrogramma, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Affinis *Graphidi scriptæ*, sed apothecia cæsio-pruinosa longiora dendroideo-divisa, thallodeo-marginata; sporæ 8–10 loculares, longit. 0·020–0·030 millim., crassit. 0·006–0·007 millim.

Admiralty Islands.—On the bark of trees; very sparingly gathered.

Verrucaria paramera, Nyl.

Verrucaria paramera, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 227.

Thallus macula luteo-pallescente indicatus; apothecia pyrenio integre nigro, parte dimidia superiore nuda convexa prominula (latit. 0·5–0·7 millim.); sporæ 8-næ, fuscæ vel fuscescentes, ellipsoideæ vel oblongo-ellipsoideæ, 6-loculares vel demum loculis quibusdam

divisis (ita duplicatis), longit. 0·024–0·034 millim., crassit. 0·010–0·015 millim. Iodo gelatina hymenialis dilute vinose rosello tincta.

Accedit versus *Verrucariam libricolam*, sed sporæ minores et simpliciores.

Admiralty Islands.—On the bark of trees; very sparingly gathered.

Verrucaria albescens, Nyl., var. *subochracea*.

Verrucaria albescens, Nyl., var. *subochracea*, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 227.

Differt præcipue thallo subochracea tincto; sporæ incolores vel subincolores, seriebus 4 bi- v. triloculosis, longit. 0·012–0·016 millim., crassit. 0·008–0·009 millim. Iodo gelatina hymenialis non reagens.

Admiralty Islands.—On thin bark; apparently frequent.

FUNGI.[1]

Agaricus (Pleurotus) scabriusculus, Berkl.

Agaricus (*Pleurotus*) *scabriusculus*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 48.

Conchiformis postice depressus, pileo subtiliter pulverulento-tomentoso demum leviter radiato-plicato; stipite brevissimo laterali cylindrico quandoque applanato; lamellis decurrentibus nec postice porosis integris.

Pileus 1–2 inches wide, an inch or more long, soft and pliant; when dry of an ochreaceous tint.

Admiralty Islands.—This species was founded on Mr Moseley's Admiralty Island specimen, but it has also been discovered in Australia.

Agaricus (Pleurotus) lachnocephalus, Berkl.

Agaricus (*Pleurotus*) *lachnocephalus*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 48.

Pileo excentrico tenui campanulato subtiliter velutino saccharino rufo umbilicato sulcato; stipite cylindrico pulverulento e basi orbiculari albo oriundo; lamellis latiusculis decurrentibus.

About $\frac{1}{3}$ inch across; stem $\frac{1}{4}$ inch high, not 1 line thick.

Admiralty Islands.—Endemic as far as at present known.

Agaricus (Pleurotus) semisupinus, Berkl. et Broome.

Agaricus (*Pleurotus*) *semisupinus*, Berkl. et Broome in Journ. Linn. Soc. Lond., xi. p. 529; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—Ceylon; Borneo; Mauritius; Australia; Tasmania.

[1] We are indebted to Dr M. C. Cooke for the particulars of the distribution of the species, and likewise for the correction of a few inaccuracies which had crept into Mr Berkeley's original enumeration in the *Journ. Linn. Soc. Lond.*, vol. xvi. 1878.

Marasmius fulviceps, Berkl.

Marasmius fulviceps, Berkl. in Hook. Lond. Journ. Bot., 1847, p. 490; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—United States, Guiana, and Brazil, and also in Ceylon.

Marasmius hispidulus, Berkl.

Marasmius hispidulus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo e convexo explanato fulvo hispido; stipite gracili deorsum albo furfuraceo, sursum primitus subtiliter velutino brunneo; lamellis ventricosis adnatis.

Pileus 2–3 lines across; stems $\frac{1}{3}$ to $\frac{1}{2}$ inch high.

ADMIRALTY ISLANDS.—Endemic.

There is also in the collection a barren *Marasmius* on *Trichomanes javanicus*.

Lentinus hygrometricus, Berkl.

Lentinus hygrometricus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo infundibuliformi, subtiliter tomentoso lineato, margine exsiccato lobato inflexo; stipite gracili sursum dilatato furfuraceo glabrescente; lamellis angustissimis decurrentibus.

Scattered on blackened dead wood.

Pileus $\frac{3}{4}$ inch across when expanded; stem 1 inch high, not a line thick.

ADMIRALTY ISLANDS.—Endemic as far as at present known.

Lentinus villosus, Fries.

Lentinus villosus, Fries, Ep., p. 388; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—West Africa, Cuba, San Domingo, and Brazil.

Polyporus (Mesopus) xanthopus, Fries.

Polyporus (Mesopus) xanthopus, Fries, Obs., ii. p. 285; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49

ADMIRALTY ISLANDS.—Widely diffused in tropical regions.

Polyporus (Pleuropus) affinis, Nees.

Polyporus (Pleuropus) affinis, Nees; Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Australia to the Philippines, Nicobars, and Pegu; also in Brazil.

Polyporus (Pleuropus) sanguineus, Fries.

Polyporus (Pleuropus) sanguineus, Fries, Ep., p. 444; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—This species inhabits all tropical and subtropical countries.

Polyporus (Mesopus) grammocephalus, Berkl.

Polyporus (*Mesopus*) *grammocephalus*, Berkl. in Hook. Lond. Journ. Bot., i. (1842), p. 148, et in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—Australia to the Philippines, India, and Ceylon, and also in the West Indies and Brazil.

Polyporus (Pleuropus) elegans, Fries.

Polyporus (*Pleuropus*) *elegans*, Fries, Ep., p. 440; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—Europe, North India, Tasmania, West Indies, and widely spread in North America.

Polyporus (Pleuropus) rasipes, Berkl.

Polyporus (*Pleuropus*) *rasipes*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo flabelliformi conchato sericeo lineato subvelutino zonato rufo, exsiccato incurvo; stipite brevi applanato hispidulo; hymenio pallido; poris minutis angulatis, dissepimentis tenuibus.

Pileus $\frac{3}{4}$ to 1 inch across; stem $\frac{1}{4}$ inch high, dilated upwards; pores $\frac{1}{200}$ inch in diameter. Much contracted when dry. The short hairs on the stem sometimes pointing upwards.

Admiralty Islands.—This species was founded on the insular specimens collected by Mr Moseley, but it has also been collected in Australia.

Polyporus (Pleuropus) stereinus, Berkl. et Cooke.

Polyporus (*Pleuropus*) *stereinus*, Berkl. et Cooke in Journ. Linn. Soc. Lond., x. p. 308; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—Also inhabiting Java and Brazil.

Polyporus (Placodermei) igniarius, Fries.

Polyporus (*Placodermei*) *igniarius*, Fries, Hymen. Eur., p. 559; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—This is known from Europe, Socotra, Ceylon, Siam, Tasmania, South Africa, and in America from the United States southward to the island of Juan Fernandez.

Polyporus (Placodermei) australis, Fries.

Polyporus (*Placodermei*) *australis*, Fries, Hymen. Eur., p. 556; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Admiralty Islands.—Spread over nearly all tropical and subtropical countries, and extending into temperate regions in Europe and New Zealand.

Polyporus (Placodermei) exotephrus, Berkl.

Polyporus (Placodermei) exotephrus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Durius; pileo sulcato-zonato, primitus subtiliter tomentoso glabrescente, margine sulcato prominulo obtuso lobato; contextu ligni colore; poris brunneo-ferrugineis minutis.

Pileus $2\frac{1}{4}$ inches wide.

Has somewhat the appearance of *Polyporus caliginosus*, Berkl.; but the flesh is pallid, not deeply ferruginous.

Admiralty Islands.—Endemic as far as at present known.

Polyporus (Placodermei) caliginosus, Berkl.

Polyporus (Placodermei) caliginosus, Berkl. in Journ. Linn. Soc. Lond., xvi. pp. 46 et 50.

Admiralty Islands.—Described from specimens collected by Mr Moseley in the Philippine Islands. Found also in the Solomon Islands.

Polyporus (Placodermei) persoonii, Fries.

Polyporus (Placodermei) persoonii, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.
Dædalea (Apus) sanguinea, Klotzsch in Linnæa, viii. p. 481.

Admiralty Islands.—Ceylon, Pegu, the Moluccas, Australia, and Bahia.

Trametes occidentalis, Fries.

Trametes occidentalis, Fries, Ep., p. 491; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

Admiralty Islands.—This has been collected in nearly all tropical countries.

Trametes lactinea, Berkl.

Trametes lactinea, Berkl. in Ann. Nat. Hist., x. p. 373, et in Journ. Linn. Soc. Lond., xvi. p. 50.

Admiralty Islands.—Ceylon, Australia, and West Africa in the Old World, and Cuba and Brazil in the New World.

Hexagona similis, Berkl.

Hexagona similis, Berkl. in Hook. Lond. Journ. Bot., 1846, p. 4, et in Journ. Linn. Soc. Lond., xvi. p. 50 (errore *affinis*).

Admiralty Islands.—Also in Ceylon and Australia, and quite recently collected in the Solomon Islands by Dr Guppy.

Hexagona picta, Berkl.

Hexagona picta, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

Pileo dimidiato, postice sanguineo-rufo, antice pallido, lineato-ruguloso plicato, primum pulverulento; hymenio umbrino; poris hic illic margine undulatis.

Pileus 2½ to 3 inches wide, ¾ inch long; pores $\frac{1}{24}$ inch in diameter.

ADMIRALTY ISLANDS.—Endemic, as far as at present known.

Laschia tremellosa, Fries.

Laschia tremellosa, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—South India, Ceylon, Mauritius, Java, the West Indies, Mexico, and South America.

Stereum elegans, Fries.

Stereum elegans, Fries, Ep., p. 545; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Bombay, Ceylon, Australia, Tasmania, West Indies, and South America.

Thelephora lamellata, Berkl. et Curt.

Thelephora lamellata, Berkl. et Curt. in U.S. Expl. Exped., xvii. p. 199, t. 1, fig. 7, et Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Also in the Fiji and Solomon Islands.

Hirneola polytricha, Mont.

Hirneola polytricha, Mont., Syllog. Gen. et Sp. Pl. Crypt., p. 181; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—This species is spread over nearly all tropical and subtropical countries, including many of the islands of Polynesia.

Hirneola rufa, Berkl.

Hirneola rufa, Berkl. in Ann. Nat. Hist., x. p. 384, et in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Ceylon.

Peziza hindsii, Berkl.

Peziza hindsii, Berkl. in Hook. Lond. Journ. Bot., 1842, p. 456, et in Journ. Linn. Soc. Lond., xvi. p. 50; Cooke, Mycographia, t. 51, fig. 200.

"The largest, very thin specimens, from the base of littoral trees, were constantly being bathed and often immersed in sea-water."

ADMIRALTY ISLANDS.—Ceylon; Arrou; New Zealand; San Domingo; Cuba; Guiana; Brazil.

ALGÆ.

MELANOSPERMEÆ.[1]

Sargassum ilicifolium, J. Agardh.

Sargassum ilicifolium, J. Agardh; Kütz., Sp. Alg., p. 625 (*Carpacanthus*); Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Fucus ilicifolius, Turner, Hist., t. 51.

Admiralty Islands.—Widely diffused in tropical seas, but we have seen no Australian specimens.

Sargassum heterocystum, Mont.?

Sargassum heterocystum, Mont., Syllog. Gen. et Sp. Pl. Crypt., p. 384? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—The species was founded upon specimens from the waters of Cochin-China.

Sargassum berberifolium, J. Agardh.

Sargassum berberifolium, J. Agardh, Sp. Alg., i. p. 337; Harv., Phycol. Austr., v. p. 9; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—West Australia, and also collected by Gaudichaud at the Admiralty Islands on Freycinet's voyage.

Sargassum aquifolium, Agardh.

Sargassum aquifolium, Agardh; J. Agardh, Sp. Alg., i. p. 330; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—Malayan Archipelago.

Sargassum gracile, J. Agardh?

Sargassum gracile, J. Agardh, Sp. Alg., i. p. 310? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—The true *Sargassum gracile* is widely dispersed on the shores of the Indian Ocean.

Sargassum vulgare, Agardh.

Sargassum vulgare, Agardh; J. Agardh, Sp. Alg., i. p. 342; Harv., Phycol. Austr., v. p. 6; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—Widely diffused in both hemispheres.

Sargassum lanceolatum, J. Agardh?

Sargassum lanceolatum, J. Agardh, Sp. Alg., i. p. 335? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

Admiralty Islands.—Western Australia.

[1] Extracted from the *Journ. Linn. Soc. Lond.*, xv. 1877, with remarks on distribution added.

Sargassum polycystum, Agardh?

Sargassum polycystum, Agardh; J. Agardh, Sp. Alg., i. p. 310? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—On the coast of Cochin-China, Singapore, and Java.

Cystophyllum muricatum, Agardh.

Cystophyllum muricatum, Agardh; J. Agardh, Sp. Alg., i. p. 231; Harv., Phycol. Austr., v. p. 8; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Australia and Indian Archipelago.

Turbinaria vulgaris, J. Agardh.

Turbinaria vulgaris, J. Agardh, Sp. Alg., i. p. 267 (*varietates plures*); Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—This is found in the warmer parts of all the great seas; and it was collected by Mr Moseley at the Arrou, Philippine, Society, and Sandwich Islands.

Padina pavonia, Linn.

Padina pavonia, Linn.; J. Agardh, Sp. Alg., i. p. 113; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Generally diffused in tropical and temperate seas.

Dictyota dichotoma, Lamour.

Dictyota dichotoma, Lamour.; J. Agardh, Sp. Alg., i. p. 92; Harv., Phycol. Austr., v. p. 12; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Common in both north and south temperate seas; rarer within the tropics.

Ectocarpus sordidus, Harv.?

Ectocarpus sordidus, Harv. in Hook. f. Fl. Tasm., ii. p. 294? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—The original was from the shores of Tasmania, and we have seen no other specimens.

Sphacelaria furcigera, Kütz.

Sphacelaria furcigera, Kütz.; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Also collected by Mr Moseley at the Sandwich Islands.

RHODOSPERMEÆ.

Acanthophora thierii, Lamour.

Acanthophora thierii, Lamour.; Harv., Nereis Austr., p. 34, et Phycol. Austr., v. p. 17; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Generally diffused in tropical and subtropical seas.

Laurencia obtusa, Lamour.

Laurencia obtusa, Lamour.; Kütz., Sp. Alg., p. 854; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—In the Atlantic from the British Islands to Brazil and the Cape of Good Hope; also in the Indian and Pacific Oceans.

Laurencia papillosa, Grev.?

Laurencia papillosa, Grev.? Kütz., Sp. Alg., p. 855? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—This species is found in the Atlantic, Pacific, and Indian Oceans.

Laurencia forsteri, Grev.

Laurencia forsteri, Grev.; Kütz., Sp. Alg., p. 854; Hook. f., Handb. Fl. N. Zeal., p. 676; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Australia, Tasmania, and New Zealand.

Mastophora lamourouxii, Dcne.

Mastophora lamourouxii, Dcne.; Harv., Nereis Austr., t. 41, et Phycol. Austr., v. p. 30; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Common on the coasts of Australia, and extending through the Malayan Archipelago to Java; also South Africa.

Amphiroa fragilissima, Linn.

Amphiroa fragilissima, Linn.; Kütz., Sp. Alg., p. 700; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Bermuda, West Indies, Pacific coast of South America, and the Malayan Archipelago.

Amphiroa involuta, Kütz.

Amphiroa involuta, Kütz.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.

Melobesia verrucata, Lamour.

Melobesia verrucata, Lamour.; Kütz., Sp. Alg., p. 696; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Mediterranean and Southern Ocean.

Jania rubens, Lamour.

Jania rubens, Lamour.; Kütz., Sp. Alg., p. 709; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Shores of Europe and America, Red Sea, Indian Ocean, and Pacific.

Desmia ambigua, Grev.

Desmia ambigua, Grev.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Indian and Pacific Oceans.

Gracilaria dactyloides, Sond.

Gracilaria dactyloides, Sond.; Harv., Phycol. Austr., ii. p. 80; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—A common West Australian species.

Gracilaria confervoides, Grev. var. ?

Gracilaria confervoides, Grev. var.? Kütz., Phycol. Gener., p. 408, Sp. Alg., p. 772 (*Sphærococcus*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—*Gracilaria confervoides* is found in the temperate seas of both hemispheres, rarer in the tropics, yet very widely spread.

Gracilaria corniculata, J. Agardh.

Gracilaria corniculata, J. Agardh, Sp. Alg., ii. p. 595; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Austral

Corallopsis australasica, Sond.

Corallopsis australasica, Sond. in Linnæa, xxv. p. 687; Harv., Phycol. Austr., v. p. 35; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Australia.

Gelidium rigidum, Vahl ?

Gelidium rigidum, Vahl? Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—This is probably a variety of the almost cosmopolitan *Gelidium corneum*, Lamour.

Hypnea divaricata, Grev.

Hypnea divaricata, Grev.; J. Agardh, Sp. Alg., ii. p. 448; Harv., Phycol. Austr., v. p. 36; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—West Australian coasts, Indian Ocean, Gulf of Mexico.

CHLOROSPERMEÆ.

Caulerpa clavifera, Agardh.

Caulerpa clavifera, Agardh, Sp. Alg., p. 437; Kütz., Sp. Alg., p. 498 (*Chauvinia*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Warmer parts of the Atlantic, Pacific, and Indian Oceans.

Valonia fastigiata, Harv.

Valonia fastigiata, Harv.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—There are specimens in the Kew Herbarium from the Friendly Islands, Philippines, and Mauritius.

Halimeda triloba, Dcne.

Halimeda triloba, Dcne. in Ann. Sci. Nat., sér. 2, xviii. p. 102; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—The only other specimens we have seen are from Ceylon.

Halimeda opuntia, Lamour.

Halimeda opuntia, Lamour.; Kütz., Sp. Alg., p. 724 (*Catenella*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—This is generally diffused in the warmer seas.

Halimeda macroloba, Dcne.

Halimeda macroloba, Dcne. in Archiv. Mus. Par., 1841, ii. p. 118, et in Ann. Sci. Nat., sér. 2, xviii. p. 103; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Australia, Polynesia, Malayan Archipelago, Ceylon, and Eastern Africa.

APPENDIX.

ON THE DISPERSAL OF PLANTS BY OCEANIC CURRENTS AND BIRDS.

Historical.

In collecting the material for the reports on the vegetation of the various oceanic islands dealt with in this work, many interesting facts concerning the active part played by the sea itself in the dispersion of plants have come to light; and, as Mr Moseley devoted special attention to this subject during the voyage of the Challenger, a brief review of the evidence before us appropriately follows here. It is true that Mr Moseley has already recorded[1] many of his observations, but they are scattered, and to a certain extent inaccessible, while a considerable collection of drift seeds and seed-vessels made by him about seventy miles north-east of Point D'Urville, New Guinea, has hitherto remained undescribed.

The diffusion of plants by oceanic currents and tides is by no means a new subject of inquiry, having long ago engaged the attention of some of the foremost writers on plant distribution; and isolated facts relating thereto are recorded in various books of travel and other publications. Among the earlier notices of the transport of seeds by the sea are those relating to various American kinds thrown up on the western coast of Europe. Sloane[2] gives "an account of four sorts of strange beans frequently cast on shore in the Orkney Isles," which he states were very fresh, being little injured by the sea. Three of them he recognised as having been seen by him growing in Jamaica: they were *Entada scandens*, *Guilandina bonduc*, and *Mucuna pruriens*. That the *Entada* retains its germinative power after the transport across the Atlantic we have evidence,[3] from the fact that five plants were raised at Kew from seeds collected in the Azores. Again, Robert Brown states[4] that Sir Joseph Banks informed him that he had received the drawing of a plant, which his correspondent assured him was raised from a seed found on the west coast of Ireland, and that the plant was indisputably *Guilandina bonduc*. Tonning[5] has the following note on fruits stranded in Norway: "Præter hasce jam memoratas Plantas spontaneas nec omittere possum Fructus nonnullos Americanos, qui ad oras nostras maritimas quovis fere anno rejiciuntur. Aut per oceanum, quo via ex America patet, aut et interdum, quod tamen rarius, per naufragia ad nostra litora transnatant." The fruits he

[1] Notes by a Naturalist on the Challenger, *passim*.

[2] *Philosophical Transactions of the Royal Society of London*, 1696, xix. p. 298.

[3] *Natural History Review*, 1863, p. 196, in note.

[4] Tuckey's Narrative of an Expedition to explore the River Zaire, Appendix v., p. 481.

[5] Amœnitates Academicæ, vii. p. 477.

enumerates are *Cassia fistula, Anacardium occidentale, Cucurbita lagenaria, Mimosa scandens, Piscidia erythrina,* and *Cocos nucifera.* This is the only record that has come under our observation of the cocoa-nut being washed ashore in Europe, for Linnæus merely repeats this; but it is probably of no rare occurrence, considering the vast quantities that are brought hither; and those found on the Norwegian coast were almost certainly from a wrecked ship, or had been cast or washed overboard. Linnæus, too, mentions, among the various means by which the geographical areas of plants are extended: "Oceanus, modo nondum cuiquam cognito, semina *Cassiæ fistulæ, Anacardii occidentalis, Mimosæ scandentis* [*Entadæ scandentis*], et *Cocos nuciferæ* ad littora usque Norvegiæ volvit, eaque, quod miraberis, adeo vegeta, ut terræ mandata germinent ac crescant."[1] The first of these four plants was raised by Martins[2] from seed stranded on the shore of Montpellier in 1856; but, as that author observes, the seeds are in separate compartments, which are apparently water-tight, and they are thus protected from the influence of the sea-water. Several other instances might be cited of plants having been raised in Europe from seeds which have traversed the Atlantic, but sufficient have been given for the purpose.

Chamisso seems to have been one of the first to record the fact[3] that foreign seeds are cast ashore in a living state by the waves in various parts of the world. As cited by Darwin,[4] he says of the Radack Archipelago, North-western Polynesia: "The sea brings to these islands the seeds and fruits of many trees, most of which have not yet grown here. The greater part of these seeds appear to have not yet lost the capability of growing." And in another place he speaks of the vast quantity of vegetable matter observed drifting in the sea in various parts of the Malayan Archipelago, naming several plants whose seeds or seed-vessels were prominent in this drift. As they are all included or incidentally mentioned in the following enumeration, it is unnecessary to give further particulars here.

Gaudichaud is another botanical traveller who paid special attention to littoral vegetation and floating vegetable matter. In the Botany of the Voyage of the "Uranie" and the "Physicienne,"[5] he devotes nearly 150 pages to general observations on the nature and composition of the vegetation of the various places visited during the course of the expedition; and, as already mentioned in the Introductory Notes of the Report on the Botany of the Admiralty Islands, several islands were visited in the extreme west of Polynesia and the east of the Malayan Archipelago, which still remain imperfectly known. He dwells particularly on the magnificent vegetation of the Moluccas, which, he says,

[1] Coloniæ Plantarum, Amœnitates Academicæ, viii. p. 3.

[2] Experiences sur la persistance de la vitalité des graines flottant à la surface de la mer, Bulletin de la Société Botanique de France, iv., 1857, p. 325.

[3] Kotzebue's First Voyage, iii. p. 155.

[4] Journal of Researches, ed. 1884, p. 455.

[5] Voyage autour du monde, exécuté sur les corvettes de S.M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819, et 1820. Botanique, pp. 1–146.

seems to dispute with the waves the possession of the soil. Such trees as *Bruguiera, Rhizophora, Ægiceras, Laguncularia, Sonneratia, Barringtonia* and *Calophyllum* actually advance into the sea in all directions. "Not only are their roots, and often portions of their trunks, immersed in the water, but their branching crowns incline in the same direction, and are bathed by the waves of the high tides. This phenomenon is specially observable in the case of *Calophyllum inophyllum* and *Barringtonia speciosa*, which even in such situations attain astonishing dimensions; and these trees were so crowded in some localities that landing was difficult." "Under these circumstances," he continues, "it is not surprising that the numerous currents which plough the Molucca Sea are charged with an immeasurable quantity of vegetable matter. Intermixed with seaweeds in these currents are leaves, flowers, and fruits, and even whole trees. Among flowers remarkable for their colour, for their number, or for their size, we distinguished those of several arboreous Apocynaceæ belonging to the genera *Plumeria* and *Tabernæmontana;* those of *Musa, Mucuna, Erythrina*, and *Portlandia*, and especially those of *Agati grandiflora* and *Spathadea longiflora.*" Prominent among the fruits, he mentions the cocoa-nut, areca-nut, and those of various other palms; *Barringtonia speciosa, Eugenia malaccensis, Xylocarpus granatum;* the open follicles of two or three species of *Sterculia;* pods of *Galedupa* [*Pongamia*], *Dolichos, Abrus, Omphalobium, Agati*, and *Adenanthera*, invariably containing their seeds; the drupaceous, fleshy, or woody fruits of *Cycas, Terminalia, Heritiera, Calophyllum*, and three or four species of *Myristica;* the long capsules of some Bignoniaceæ; the tunicated fruit of *Hernandia sonora*, and, finally, the fleshy fruit of *Tabernæmontana aurantiaca*, which exactly resembles an orange in shape and colour.

Alphonse De Candolle,[1] who contends that oceanic currents have played a comparatively unimportant part in the diffusion of plants generally, nevertheless regards the sea as the conveying agent of many littoral plants from one country to another.

LIST OF PLANTS REGARDED BY A. DE CANDOLLE AS HAVING PROBABLY OR POSSIBLY BEEN DIFFUSED BY OCEANIC CURRENTS.

Origin probably American.

Naturalised in Africa only.

Drepanocarpus lunatus, Mey.
Ecastaphyllum brownei, Pers.
Mucuna urens, DC.
Chrysobalanus icaco, Linn.
Telanthera maritima, Moq.
Alternanthera achyrantha, R. Br.
Iresine vermicularis, Moq.
Iresine aggregata, Moq.
Remirea maritima, Aubl.

Naturalised in Asia only.

Tephrosia piscatoria, Pers.

[1] Geographie Botanique Raisonnée, ii. p. 792–796.

Naturalised in Africa and Asia.

Hibiscus tiliaceus, Linn.
Acacia farnesiana, Willd.
Rhizophora mangle, Linn.[1]
Batatas pentaphylla, Choisy.

Origin Asiatic or African.

Naturalised in America.

Guilandina bonduc, Linn.
Abrus precatorius, Linn.
Scævola lobelia, Linn.
Batatas paniculata, Choisy.
Ipomœa pes-caprœ, Sweet.

Transported from the Old World into the New, or the reverse; but of doubtful origin.

Telanthera frutescens, Linn.
Stenotaphrum americanum, Schranck.
Sporobolus virginicus, Kunth.

Common to Asia, Africa, and America, without any clue to its origin.

Canavalia obtusifolia, DC.

The majority of the plants in the preceding list come under consideration in this work, and many of them are now known to have a much wider range than De Candolle attributed to them, particulars of which may be found by consulting the indexes to the various parts. Others, such as *Remirea maritima* and *Abrus precatorius*, although not coming within the scope of this work, are very widely dispersed in maritime districts.

The lack, however, of reliable and circumstantial evidence of the dispersion of plants by oceanic currents was commented upon by De Candolle in the admirable work named, and since the date of its publication (1855) the subject has received considerable attention, though, as the sequel shows, very much remains to be done before we shall be in a position to measure the probable extent of oceanic influence in the dispersion of land plants. Too many writers have generalised on the topic, without recording the data upon which their generalisations were founded. This was not due, doubtless, to a want of observation, but rather to inappreciation of the importance of recording, at the time of observation, facts trifling in themselves taken separately, but significant in the aggregate. Darwin very fully realised on his travels the necessity for actually noting small facts, and he thereby provided himself with materials for a lifelong study; and his example has been followed by many of the most successful of living naturalists. At p. 113 of the Report on the Botany of the South-eastern Moluccas, will be found a list of the plants collected by Darwin in the Keeling Islands, all of which he regarded as having been transported thither by the waves of the sea; and further evidence of the action of the sea in various parts of the world substantially confirms this view. The question arising again after his return home, he carried out and published[2] the results of a series of experiments to test how long various different seeds would bear immersion in sea-water without losing their

[1] The Asiatic species is distinct, see *ante*, p. 149.

[2] *Gardener's Chronicle*, 1855, and *Journ. Linn. Soc. Lond.*, i. p. 130.

vitality. In this he was assisted by Sir Joseph Hooker, and the Rev. M. J. Berkeley conducted a similar set of experiments, the results of which first appeared separately in the Gardener's Chronicle, afterwards jointly with Darwin's in the Journal of the Linnean Society. The principal fact ascertained from these experiments was that the seeds of many plants belonging to the most widely different natural orders germinated after long immersion in sea-water—some after upwards of 100 days; and these were not by any means all seeds of plants which naturally inhabit the sea-shore or salt marshes; yet among them were *Atriplex*, *Beta*, *Spinacia*, and *Rheum*. A species of *Capsicum* endured the trial best, thirty seeds out of fifty-six having germinated well after 137 days' immersion. But Darwin was led to believe from these experiments that he had previously over-estimated the action of the sea on the dispersion of plants, for he says :—"I soon became aware that most seeds, in accordance with the common experience of gardeners, sink in water; at least I have found this to be the case, after a few days, with the fifty-one kinds of seeds which I have myself tried; so that such seeds could not possibly be transported by sea-currents beyond a very short distance. Some few seeds, however, do float, as I have tried with some of those cast by the Gulf Stream on the coast of Norway. From knowing that timber is often cast on the shores of oceanic islands, far from the mainland, and from having met with accounts of floating vegetable rubbish off estuaries, I assumed that plants, with ripe seeds, washed into the sea by rivers, landslips, &c., might be drifted by sea-currents during a period of some weeks. The closing of capsules, of pods, and of the heads of Compositæ, &c., when wetted, and their re-opening when cast on shore and dried, the seeds being thus allowed to be driven inland by the first stormy winds, seemed to favour such means of transport. But in putting thirty-four plants of different orders, with ripe fruit, into salt water, one alone (*Euonymus*) floated a month, being buoyed up by its fruit; the others all sank in twenty-one days, some in five, and several in seven, nine, and eleven days. But I am not sure that I have made the trial fairly, for I kept the floating plants in too warm and dark a place, which might have favoured their decay."

Of course, Darwin's experiments proved nothing of any plants not tried, and not everything bearing on the question of those that were tried. Thus, the seed-vessels, enclosing seeds, of some of them might float, though on looking through the list very few of the species are such as are likely to be conveyed from place to place by the sea, except under extraordinary circumstances. Subsequently Darwin made some more experiments, and he found that many things which sank when green, or floated only a short time, floated a long time when dry.[1] Thus, ripe hazel-nuts sank immediately, but when dried they floated for ninety days, and afterwards when planted they germinated. An asparagus plant with ripe berries floated for twenty-three, when dried it floated for eighty-five days, and the seeds afterwards germinated. Ripe seeds of *Helosciadium* sank in two

[1] Origin of Species, p. 359.

days; when dried they floated more than ninety days, and afterwards germinated. He also alludes to another way in which the sea might indirectly assist in the dispersion of plants.[1] "But seeds may be occasionally transported in another manner. Drift timber is thrown up on most islands, even on those in the midst of the widest oceans; and the natives of the coral islands in the Pacific procure stones for their tools solely from the roots of drifted trees. I find, on examination, that when irregularly-shaped stones are embedded in the roots of trees, small parcels of earth are frequently enclosed in their interstices and behind them—so perfectly, that not a particle could be washed away in the longest transport: out of one small portion of earth thus completely enclosed by wood in an oak about fifty years old, three dicotyledonous plants germinated. I am certain of the accuracy of this observation. Again, I can show that the carcases of birds, when floating on the sea, sometimes escape being immediately devoured; and seeds of many kinds in the crops of floating birds long retain their vitality. Peas and vetches, for instance, are killed by even a few days' immersion in sea-water; but some taken out of the crop of a pigeon which had floated on artificial salt water for thirty days, to my surprise, nearly all germinated."

Two years later Professor Ch. Martins, of Montpellier, published[2] an account of some similar experiments tried by him with mostly different kinds of seeds. He first of all noted which of them floated in sea-water; but it is not clear whether the trial was merely momentary or prolonged. However, of ninety-eight kinds of seeds and seed-vessels containing seeds, fifty-nine, we are informed, floated. Instead of plunging them in water, as Darwin and Berkeley did, Martins employed a perforated box, with as many compartments as kinds of seeds, and attached it to a buoy, so that it rose and fell with the waves, and the seeds were thus alternately exposed to the air and water, as they would be if floating free. After forty-five days' exposure the box was opened, when it was found that forty-one kinds of seed out of ninety-eight were rotten. The remaining fifty-seven apparently sound ones were sown, and of these thirty-five germinated; but as sixteen of them were of greater specific gravity than sea-water, they would have to be deducted, leaving only nineteen species out of ninety-eight that might possibly germinate and establish themselves on a coast after floating for six weeks on the surface of the sea. These nineteen species were: *Asclepias cornuti*, *Asphodelus cerasiferus*, *Beta vulgaris*, *Cakile maritima*, *Cucurbita pepo*, *Ephedra distachya*, *Eryngium maritimum*, *Euphorbia paralias*, *Gingko biloba*, *Linum maritimum*, *Nelumbium speciosum*, *Paliurus aculeatus*, *Pancratium maritimum*, *Ricinus africanus*, *Ricinus communis*,[3] *Rumex aquaticus*, *Salsola kali*, *Scabiosa maritima*, and *Xanthium macrocarpum*.

About half of the species, it will be seen, are essentially littoral plants, whose seeds are ordinarily exposed to the influence of sea-water.

[1] *Loc. cit.*, p. 360.

[2] Bulletin de la Société Botanique de France, iii. p. 324.

[3] Really varieties of one species.

To test still further the kinds of seeds which appeared sound in the first experiment, thirty-four of them were subjected to a trial of ninety-three days' duration. Only nine of them withstood this trial and germinated, when placed under the most favourable conditions, namely: *Cucurbita pepo, Acacia julibrissin, Xanthium macrocarpum, Beta vulgaris, Rumex aquaticus, Ricinus africanus, Ricinus communis,*[1] *Ephedra distachya*, and *Canna gigantea*. And of these the *Acacia* and *Canna* do not float,[2] so that out of a total of ninety-eight kinds, only seven[3] retained their germinative power after three months floating on the sea. This, as Martins observes, is a very small proportion, and then the chances of their germinating and establishing themselves if cast ashore are infinitesimally small; yet it does not follow, we think, that the sea has exercised a comparatively inappreciable influence in the diffusion of the vegetation of the world, though the number of species so transported be relatively insignificant.

A third series of experiments, with the same object, was undertaken by Mr Gustave Thuret, at the instigation of M. Alphonse De Candolle. The results[4] were much the same as those obtained by Martins; but as the seeds were subjected to a thirteen months' ordeal, it is interesting to note the species that survived and germinated afterwards. They were: *Silene atocion, Hibiscus speciosus, Medicago sativa, Mesembryanthemum crystallinum, Apium graveolens, Cichorium endivia, Campanula laciniata, Lycopersicum esculentum, Phytolacca* sp., and *Beta vulgaris*. From the prolonged period these seeds withstood the action of sea-water it would seem that certain seeds are practically imperishable therein; and, what is more remarkable, Mr Thuret states that several of them not only germinated, but actually grew more vigorously than corresponding samples of the same seed kept dry during the same period. It is noteworthy, too, that the ten plants which underwent this trial, belong to as many different natural orders; and they are not specially maritime plants. Doubtless the condition of the seed at the time of immersion has much to do with its capability of floating, and likewise of its power of enduring the action of sea-water. In a note at the end of Thuret's paper De Candolle reiterates his conviction that oceanic currents exercise extremely little influence in the diffusion of plants, and that it is limited to the littoral element. Thuret[5] himself is more dogmatic, for he says, with the exception of plants that grow naturally on sandy or muddy sea-shores, one could not seriously admit that seeds stranded on the sea-shore would ever find the conditions necessary for their development and the propagation of their species.

Without actual proof of the contrary, this might be treated as a false inference, because we know that many plants, not specially littoral, grow equally well just above the ordinary high-water line as farther inland; and in stormy weather, the only times at

[1] Varieties of one species.

[2] The pods of the former probably would.

[3] Only six, counting the varieties of *Ricinus* as one.

[4] Archives des Sciences de la Bibliothèque Universelle, July 1873, p. 177.

[5] *Loc. cit.*, p. 182.

which vegetable rubbish is cast ashore in large quantities, the waves and the wind combined project light objects, and heavy ones too, for that matter, to a considerable distance beyond the reach of the tides. De Candolle further urges, that admitting a seed having been conveyed to a shore, distant from its original home, and having there germinated, the chances of its not being scorched up by the sun, destroyed by animals, or choked by the shade and roots of plants already in possession of the soil, are exceedingly small. Granting the full force of this remark, there is still something to be said of the chances of escape, and this effected, the astonishing reproductive power developed by some plants when first transported to a foreign soil would give such invaders an advantage over the native plants, and they might in this way soon become more prominent than many of the older inhabitants.

It will be understood that we are not attempting to prove that the sea has been the principal agent, or indeed anything more than quite a subordinate agent, in bringing about the present distribution of plants. Further than this, the action of oceanic currents and birds of passage combined is, in our opinion, insufficient to account for the presence of certain elements in the vegetation of many oceanic islands.

In addition to Mr Moseley's collection of drift-seeds and seed-vessels and records of stranded seeds and plants, and the various other sources of information alluded to in the foregoing paragraphs, there has quite recently been received at Kew, from Mr Morris, Director of Public Gardens and Plantations, Jamaica, a collection of seeds and fruits washed ashore at the Palisadoes Plantation, Jamaica. Combined, these collections will give some idea of what is at present known concerning the dispersion of plants by oceanic currents; and it may also be the means, perhaps, of inducing persons who have opportunities for observing facts connected therewith to put them on record. The collection from off the coast of New Guinea is of as much interest as a specimen of the flora of New Guinea, as it is in relation to the distribution of plants.[1] It is now so long since it was made, that the notes on the state of the various objects may be very wide of what it was when they were taken ten years ago. Moseley describes meeting with the driftwood, &c., in the following words:[2]—

"On February 22, 1875, at noon, the ship was about seventy miles north-east of Point D'Urville, New Guinea, where the great Ambernoh River, the largest river in New Guinea, runs into the sea. This river probably rises in the Charles Lewis Mountains, on the opposite side of New Guinea; these mountains reach up to the great altitude of 16,700 feet. So large is this river, that, even at this great distance from its mouth, we found the sea blocked with driftwood brought down by it. We passed through long lines of driftwood, disposed in curves at right angles to the direction in which lay the river's mouth. The ship's screw had to be constantly stopped for fear it should be fouled by the wood. The logs had evidently not been very long in the water, being covered only by a few

[1] See Narr. Chall. Exp. vol. i. pp. 679, 680, 1885.

[2] Notes by a Naturalist on the Challenger, p. 432, *et seq.*

young barnacles (*Balanus*) and Hydroids. Amongst the logs were many whole uprooted trees. I saw one of these two feet in diameter. The majority of the pieces were of small wood, branches and small stems. The bark was often floating separately. The midribs of the leaves of some pinnate-leaved palm were abundant, and also the stems of a large cane-grass (*Saccharum*), like that so abundant on the shores of the great river Wai Levu, in Fiji.[1] One of these canes was fourteen feet in length, and from one and a half to two inches in diameter. Various fruits of trees and other fragments were abundant, usually floating, confined in the midst of the small aggregations into which the floating timber was almost everywhere gathered. Amongst them were the usual littoral seeds, fruits of two species of *Pandanus*, of *Heritiera littoralis*, of a *Barringtonia*, and of *Ipomœa pes-caprœ*. But besides these fruits of littoral plants, there were seeds [and seed-vessels] of forty or fifty species of more inland plants. Very small seeds were as abundant as large ones, the surface-scum being full of them, so that they could be scooped up in quantities with a fine net. With the seeds occurred one or two flowers, or parts of them. I observed an entire absence of leaves, excepting those of the palm, on the midribs of which some of the pinnæ were still present. The leaves evidently drop first to the bottom, whilst vegetable drift is floating from ashore. Thus, as the rubbish sinks in the sea-water, a deposit abounding in leaves, but with few fruits and little or no wood, will be formed near shore, whilst the wood and fruits will sink to the bottom farther off land. Much of the wood was floating suspended vertically in the water; and, most curiously, logs and short branch pieces thus floating often occurred in separate groups, apart from the horizontally floating timber. The sunken ends of the wood were not weighted by any attached masses of soil or other load of any kind. Possibly the water penetrates certain kinds of wood more easily in one direction, with regard to its growth, than the other. Hence one end becomes water-logged before the other: I could arrive at no other explanation of the circumstance. It is evident that a wide area of the sea off the mouth of the Ambernoh River is thus constantly covered with driftwood, for the floating wood is inhabited by various animals, which seem to belong to it, as it were. The fruits and woods were covered with the eggs of a Gasteropod Mollusk and with a Hydroid, and the interstices were filled with Radiolarians washed into them, and gathered in masses just as Diatoms in the Antarctic Seas are gathered together in the honeycombed ice. Two species of crab inhabit the logs in abundance, and a small *Dendrocœle* Planarian swarms all over the drift matter, and on the living crabs also. A *Lepas* was common on the logs."

[1] No recognisable specimen of this grass reached Kew.

ENUMERATION

OF THE DRIFT-SEEDS AND SEED-VESSELS[1] COLLECTED OFF THE COAST OF NEW GUINEA.

ANONACEÆ.

THERE are remains of three different species of this order from the New Guinea drift. One is a small free seed, not more than a quarter of an inch in diameter, the genus of which is quite uncertain; the second is a one-seeded stipitate carpel of a species of *Polyalthia* or *Ellipeia;* and the third is a naked seed of unusual shape, which may belong to the genus *Artabotrys*, or to a new one. It resembles the seed of *Artabotrys odoratissimus*, Blume (Fl. Jav., Anon. p. 53, t. 31 B., fig. 8), but instead of being truncate at the base, it is hollowed.

MENISPERMACEÆ.

Chlænandra ovata, Miq.? (Plate LXIV., A.)

Chlænandra ovata, Miq.? in Ann. Mus. Lugd. Bot., iv. p. 83; Beccari, Malesia, i. p. 141.

New Guinea drift.

Dr Beccari, who has devoted so much of his life to the investigation of the flora of the Malayan Archipelago and New Guinea, and to whom a drawing of this empty water-worn seed-vessel was sent, agrees with us that it is a Menispermacea, and he suggests that it may be *Chlænandra ovata*, Miq., of which, however, we can find no description of the fruit. In order to make sure that we had the same thing in view, Dr Beccari returned the drawing, together with half a fruit in the same macerated condition as the one represented in our plate, though it is just possible that his fruit may belong to a different species, for the vascular structure is not the same in the two. In the one he sends the wavy plates are deeply channelled. Whether there be two or not, the fruit is larger than that of any other member of the order that we have seen, though *Hæmatocarpus thomsoni*, Miers, (Contrib. Bot., iii. p. 325, t. 134; Hook. f., Fl. Brit. Ind., i. p. 106), is not far inferior in size, being, without the stipes, an inch and three quarters long. But the *Hæmatocarpus* is nearly oval in shape, whereas the present would seem to have been nearly spherical. The

[1] Bare names without references are given of most of those species already mentioned in this Part.

fruit of the former is described as having a hard, blood-red sarcocarp, with the mesocarp traversed by stout vessels from the thin crustaceous endocarp, and this description applies fairly well to the skeleton fruit from the New Guinea drift, save that the endocarp of this is more woody. When fresh this must have been nearly or quite two inches and a half in diameter. Beccari mentions, *loc. cit.*, that he never found the fruit attached to the plant, but always picked it up from the ground.

The largest fruit of the order described is that of *Macrococculus pomiferus*, Beccari (Malesia, i. p. 161). This is also drupaceous and globose or pyriform, and about four inches long by three inches thick. It is from the same country.

BIXINEÆ.

Pangium edule, Reinw.

Pangium edule, Reinw.; Miq., Fl. Ind. Bat., i. 2, p. 109; Horsf., Pl. Jav. Rar., p. 205, t. 43; Blume, Rumphia, iv. p. 20, t. 178; Blanco, Fl. Philipp., ed. 3, t. 391.

New Guinea drift.

Miquel states that this is generally spread in the Malayan Archipelago, from Sumatra to the Celebes, Amboina, and Ceram, though rare in Amboina; and it is also common in the Philippines; but hitherto it has not been found either in Continental Asia or in Australia. It is commonly cultivated by the Malays for the sake of its large, oleaginous seeds, which are an important article of food. The fruit varies considerably in size and shape, according to Blume, who represents one nine inches long and six inches across the middle. It has a thick fleshy indehiscent pericarp, which must decay before the seeds become free. The broad, irregularly wedge-shaped seeds measure two inches or more in their greatest diameter; and they are provided with a crustaceous testa apparently impervious to water. Only one seed is in the collection, and that is sound, though it has probably lost its germinative power. In its present state it floats with about half its body submerged. Good flowering specimens of this tree are wanted for the Kew Herbarium.

DIPTEROCARPEÆ.

Vateria papuana, Dyer. (Plate LXIV., B.)

Vateria papuana, Dyer, *ante*, p. 123.
Vatica papuana, Dyer in Journ. Bot., 1878, p. 100.
Vateria sp., Beccari in D'Albertis, New Guinea, ii. p. 394.

Fruits from the New Guinea drift, and sea-beach Arrou Islands; flowering specimens and fruits from Ramoi, Southern New Guinea.

In the first place, only flowering specimens of this very distinct Dipterocarp were communicated to Mr Dyer, and as the floral structure agreed with *Vatica*, it was referred

to that genus; but subsequently Dr Beccari sent further specimens, collected by D'Albertis on the Fly River, together with fruits believed to belong to the same species. And fruits exactly like those collected by D'Albertis were found by Moseley in the drift off the mouth of the great Ambernoh River, and on the sea-beach of the Arrou Islands; hence it would appear to be a common tree in the region. Whether it grows in the Arrou Islands or the fruits were washed ashore is uncertain. The genus *Vateria* is spread over the Western Peninsula of India and the Malayan Archipelago; and the present species is remarkable for its much-thickened recurved sepals.

MALVACEÆ.

There are perfectly sound-looking seeds of a species of *Hibiscus* from the New Guinea drift; they will float now, but with their body almost wholly immersed.

STERCULIACEÆ.

Heritiera littoralis, Dryander.

New Guinea drift.

The large crustaceous indehiscent one-seeded carpels of this tree seem to be quite impervious to water, and from their lightness would doubtless float for a long time. The seed is destitute of albumen, but the enormously thick cotyledons fully compensate in the process of nutrition for its absence. Like many other common littoral trees, this flourishes equally well at a distance from the sea.

GUTTIFERÆ.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Wight, Ic. Pl. Ind. Or., t. 77.

New Guinea drift.

There is a number of the one-seeded, globular fruits of this common littoral tree of the region. They vary in size from three quarters of an inch to one inch and a half in diameter, and in their present condition float with about half of their bulk out of water. The seeds are very oily, the oil being stored in the thick fleshy cotyledons, which fill up the whole cavity of the seed. Seemann (Fl. Vit., p. 12) says that this tree is one of the most common littoral plants in the Fiji group; its round fruits, mixed with the square ones of *Barringtonia speciosa*, the pine-cone like ones of the sago-palm, *Sagus vitiensis*, Wendl., and the flat seeds of *Entada scandens*, Benth., densely cover the sandy beaches. Moseley (Notes by a Naturalist on the Challenger, p. 387) mentions this as one of the earliest inhabitants of newly raised coral islands. "As soon as ever a few littoral trees, such as

Barringtonia and *Calophyllum inophyllum*, have established themselves by means of their drifting seeds on a freshly dry coral islet, the fruit-pigeons alight in the branches in their flight from place to place, and drop the seeds of all kinds of other trees with succulent fruits. I have seen the pigeons thus resting on two or three small littoral trees, which as yet form almost the only vegetation of Observatory Island, a very small islet at Nares Harbour, Admiralty Islands."

Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 101), remarks that, without being exactly rare in the Marquesas, it is by no means so common there as in the Society Islands, and a list of the trees remarkable for their size would not be a long one. He adds:—"The poorest soils are not unfavourable to it, for one often sees seeds that have been cast ashore on the coral islands germinating and growing into trees." H. Mann (Proc. Amer. Acad., vii. p. 156) includes it among the plants he regards as having been introduced into the Sandwich Islands by the aborigines.

The genus *Calophyllum* is also represented in the New World, and there are fruits of one species in Mr Morris's collection of seeds and seed-vessels stranded in Jamaica.

OCHNACEÆ.

Brackenridgea sp. (Plate LXIV., E.)

New Guinea drift.

We are indebted to Dr Beccari for the determination of the genus of this singular seed-vessel, of which there were a dozen or more in the collection, all of them more or less encrusted. *Brackenridgea* was founded on a Fijian shrub, differing, among other things, from *Gomphia* in having "the nearly annular ovule and seed curved around a large projection into the cell of the ovary (in the manner of *Menispermum*), which arises from its inner angle near the base" (A. Gray, Bot. U.S. Expl. Exped., i. p. 361, t. 42). A second species, *Brackenridgea zanguebarica*, is figured in Hooker's Icones Plantarum, xi. p. 77, t. 1096, the fruit of which is unknown; but Oliver, *loc. cit.*, says that he regards *Brackenridgea* as a section of *Gomphia* rather than a good genus. *Gomphia hookeri*, Planchon (Hook. Lond. Journ. Bot., vi. p. 3), from the Malayan Peninsula, should likewise be referred to *Brackenridgea*, if the genus be retained. In the present species the curvature of the seed is not caused by a mere intrusion of the side of the carpel; there are two distinct cavities crossing and curving round each other at right angles, the one containing the curved seed, the other empty. This empty cavity gives the fruit its buoyancy.

So far as we are aware, no member of the Ochnaceæ has previously been recorded from New Guinea. Neither Mueller, in his Descriptive Notes on Papuan Plants, nor Beccari, in his Notes on the Plants collected by D'Albertis, in the New Guinea of the latter, includes

any. Since the publication of the Flora Australiensis, a species has been discovered in Queensland, and described by Mueller (Fragm. Phytogr. Austr., v. p. 29) under the name of *Brackenridgea australiana.*

MELIACEÆ.

Carapa moluccensis, Lam.

New Guinea drift.

A maritime tree growing on dry sea-beaches, not in swamps, according to Seemann (Fl. Vit., p. 38), who says that *Carapa obovata*, Blume, which is regarded by some botanists as a variety of *Carapa moluccensis*, has a very different aspect, and invariably inhabits mangrove swamps. Miquel also retains them as distinct species, but from the Museum and Herbarium specimens we are unable to decide whether there be more than one species from this region. The seed-vessel varies very much in size, the larger ones equalling in size a child's head; and the angular, irregularly shaped seeds vary more than one half in size in the same capsule, the larger ones being as much as four or five inches across in the widest part. These seeds are very light, a great part of their bulk consisting of a dense, fibrous, spongy testa enclosing the large embryo. *Carapa* is also represented in the New World.

AMPELIDEÆ.

Leea sambucina, Willd. ?

New Guinea drift.

One fruit only, which certainly belongs to this order, and almost certainly to this genus and species, which is exceedingly common throughout the region. The seed appears quite sound, and a cross section of the fruit so closely agrees with the species in question as to be indistinguishable. It has the characteristic hard testa of the order.

ANACARDIACEÆ.

Dracontomelon ?

New Guinea drift.

Dracontomelon is a small genus restricted to Tropical Asia and Polynesia. The fruit has a fleshy mesocarp enclosing a hard, woody 2–5-celled stone or endocarp. Nothing remains of the fruit except the woody part, and the seed-cells are empty.

Among the indeterminable fruits in the drift collection are several which may belong to this order, but they are too much decayed or insufficiently developed for determination.

LEGUMINOSÆ.

Mucuna sp.

New Guinea drift.

A single seed belonging to this genus. In the Kew Museum there are stranded pods and seeds of various species of *Mucuna* from the east coast of Africa (Kirk), Kaffraria (Hutton), Azores (Darwin), Portsmouth (Dickson), and Lofoten Islands (Blytt).

Dioclea reflexa, Hook. f.

Dioclea reflexa, Hook. f.; Oliver, Fl. Trop. Afr., ii. p. 189; Griseb., Fl. Brit. W. Ind., p. 198.

New Guinea drift.

There are seeds of this in the Kew Museum from Tristan da Cunha, where they were washed ashore. They were collected by Mr Moseley. It is widely spread in Tropical Asia, Africa, and America. The allied *Dioclea violacea*, Mart., inhabits Brazil, and it has also been collected in the Fiji Islands, Tahiti, and the Sandwich Islands, whither it may have been conveyed by currents.

Canavalia obtusifolia, DC.

Canavalia obtusifolia, DC.; Griseb., Fl. Brit. W. Ind., p. 197.

New Guinea drift, and also washed ashore at Palisadoes Plantation, Jamaica.

ROSACEÆ.

Parinarium sp. ?

New Guinea drift.

Parinarium is spread nearly all over the tropical regions, and although the fruit which we have referred to this genus is very much water-worn, the remains of the basal style, together with its general character, are sufficient to prove its affinity. It is not unlike *Parinarium insularum*, A. Gr.

RHIZOPHOREÆ.

Rhizophora mucronata, Lam.

Germinated plantlets in the New Guinea drift.

The somewhat top-shaped fruit of this mangrove is always one-seeded, although the young ovary is two-celled, with two ovules in each cell, and it is only one and a half to two inches long; yet from the embryo within, which in germination protrudes from the top, is developed a radicle of extraordinary length before the fruit leaves the plant. The radicle is spindle-shaped, sharply pointed, often more than a foot in length, and sufficiently heavy to pierce the mud when it falls; at which time the plumule is still quite small. Of

course, as these trees grow only in tidal swamps, salt water does not injure the plantlets thus started in life; but what chances they have of growing when conveyed to a distance and thrown up in a prone position, we do not know. Judging, however, from the wide distribution of the present and other species, they would grow in suitable situations.

Bruguiera rheedii, Wight et Arn.

Germinated plantlets in the New Guinea drift.

The mode of reproduction of this mangrove is exactly the same as in *Rhizophora*, but the fluted radicle does not reach nearly such large dimensions. Like the last, it is very widely diffused in tidal swamps within the tropics in the Old World.

COMBRETACEÆ.

Terminalia sp.

Fruits in the New Guinea drift.

The thick corky pericarp of this fruit is very much water-worn, and beset with animal organisms, yet the seeds are apparently sound. There are many species of this genus, several of which, like *Terminalia catappa*, Linn., are littoral trees, though they grow equally well inland under cultivation. The nearest we have seen to the present is an unnamed one collected in the Fijis by Mr Horne. It may, however, be the common *Terminalia catappa*, which is very widely dispersed in Tropical Asia, and often planted in other tropical countries.

Lumnitzera coccinea, Wight et Arn.

Lumnitzera coccinea, Wight et Arn.; Hook. f., Fl. Brit. Ind., ii. p. 452; Benth., Fl. Austr., ii. p. 503; Miq., Fl. Ind. Bat., i. 1, p. 606; A. Gr., Bot. U.S. Expl. Exped., i. p. 615; Seem., Fl. Vit., p. 94.
Lumnitzera purpurea, Presl, Repert. Bot., i. p. 155.
Laguncularia purpurea, Gaud., Bot. Voy. Freyc., p. 481, t. 4 (*Laguncularia coccinea* in tab.)
Pyrranthus littoreus, Jack in Malay Misc., ii. p. 57.

New Guinea drift.

A shrub or small tree inhabiting mangrove swamps in the Malayan Peninsula and Archipelago, North Eastern Australia, and Western Polynesia. There are Polynesian specimens in the Kew Herbarium from New Caledonia, Samoa, the Fijis, Solomon group, and Funafuti in the Ellice group, but not from any of the islands farther eastward. Seemann states that it is common on the sea-beach of all the islands of the Fijian group. *Lumnitzera racemosa*, Willd., the only other species of the genus, covers nearly the same area as the present, and also extends to the coasts of India proper, Ceylon, and Eastern Africa.

MYRTACEÆ.

Barringtonia speciosa, Linn. f.

Fruits in the New Guinea drift.

There can be no question about the big square fruits of this tree being perfectly at home in salt water. As we have set forth at p. 152, it reaches the most remote islands of the Pacific, and it is one of the first arboreal occupants of newly-raised coral islets. Mr Moseley picked up on the beach of Arrou a large succulent flower of a species of this genus.

RUBIACEÆ.

Guettarda speciosa, Linn. ?

A fruit from the New Guinea drift. Belongs apparently to this very widely diffused littoral shrub or small tree.

APOCYNACEÆ.

Chilocarpus sp. ?

Much decayed fruit in the New Guinea drift.

Cerbera odollam, Gærtn.

Decayed fruits containing dead seeds in the New Guinea drift. The fibrous fruit of this common sea-shore tree would doubtless bear long immersion without injury to the exalbuminous seeds, though the seeds of these are quite dead. There are several unrecognisable fruits in the collection which probably belong to this Order.

Tabernæmontana sp. ?

This is the vermilion-red fruit mentioned by Moseley in the Journal of the Linnean Society (xv. p. 77). He found it in the Admiralty Islands, and abundantly at Arrou, thickly scattered on the mud beneath the trees on the sea-shore, as well as in the drift off the coast of New Guinea. Although the pericarp is completely decayed, the seeds appear to be sound, and the embryo quite perfect. The complicate seeds, with a somewhat corky, rugose testa, do not answer to the description given in Bentham and Hooker's Genera Plantarum, but the seeds of comparatively few species are known. Indeed, this is very near, if not the same as, *Tabernæmontana aurantiaca* of Gaudichaud in Freycinet's Voyage Botanique, pp. 50 and 55, and tab. 61, which was collected in the island of Rawak. Gaudichaud's analysis of the seed, however, represents the embryo nearly as long as the seed, with a radicle longer than the cotyledons, whereas in ours the embryo was found in the axis of the albumen near one end of the seed, and not more than half its length, while the radicle was very short.

CONVOLVULACEÆ.

Among the New Guinea drift-seeds are several species belonging to this order, and probably to *Ipomœa;* and Moseley specially mentions seeing *Ipomœa pes-caprœ* (*Ipomœa biloba*) in his Notes, reproduced at p. 104. Particulars of the wide distribution of this plant in maritime districts, and the capability of its seeds to bear long immersion in sea-water, are given in Part I., p. 51, II., p. 80, and III., p. 169.

VERBENACEÆ.

Minute fruits from the New Guinea drift, probably belonging to this order.

LAURINEÆ.

In the collection of drift objects there is the very hard crustaceous deeply grooved empty endocarp of an oval, slightly oblique fruit, which may belong to some member of the Laurineæ. There is a similar unnamed fruit in the Kew Museum from Borneo, collected by Motley. Denuded of its outer coat, this is upwards of four inches in length.

Hernandia sp. ?

A single seed in the New Guinea drift.

The testa of the seed is much water-worn, and hardly recognisable, the distinctive annular raphe not being discernible; but the large embryo, with thick, lobed, sub-ruminate cotyledons, is exactly that of *Hernandia*. The species must remain doubtful, but it may be the widely diffused *Hernandia peltata*, or it may be one of the more local species of the region.

CUPULIFERÆ.[1]

Quercus sp. (Plate LXV., H.)

A number of acorns, destitute of cups, from the New Guinea drift.

Unlike many exalbuminous seeds, those of *Quercus* retain their vitality only a very short time, either moist or dry. According to F. von Mueller (Victorian Naturalist, Dec. 1884), D'Albertis found acorns of two kinds of oak drifted down the Fly River, but, as in ours, the cups were washed off. Whether there be any described species of *Quercus* from New Guinea we do not know. In the place cited, however, Mueller describes the foliage of a species of a tree (*Quercus guppyi*, Muell.), discovered in the volcanic island of Oima, one of the Solomon group, by Dr H. B. Guppy of H.M.S. "Lark" during a recent

surveying voyage. This proves not to be an oak, for since the foregoing was written, Dr Guppy's collections have been presented by him to Kew, and the supposed oak, as Prof. Oliver pointed out, is a laurel. It is a species of *Litsea* (*Tetranthera*), very closely allied to an unnamed one at Kew from New Caledonia. It is only fair to Baron Mueller to state that he did not see the fruit which Dr Guppy excusably mistook for acorns; and the resemblance is so strong that a more experienced observer of botanical characters might have been deceived at first sight. The fruit is the shape of a small acorn—that of *Quercus ilex*, for example, and it is seated in a thickened, cupular perianth; and the solitary seed is exalbuminous, with large cotyledons filling the whole cavity.

PALMÆ.

Nipa fruticans, Wurmb.

Seed-vessels in the New Guinea drift.

The comparatively restricted area of this absolutely littoral palm is given in the enumeration of the plants from the South-eastern Moluccas. It is an exceedingly abundant plant in many parts of the Malayan Archipelago especially, covering large areas in the tidal swamps. Chamisso (Bemerkungen auf einer Entdeckungs-Reise) enumerates this among other seeds cast ashore at Java in a germinating condition. Sir Joseph Hooker, describing the vegetation of the Sunderbunds (Himalayan Journals, ii. p. 355), says: "Receding from the Megna, the water became salter and *Nipa fruticans* appeared, throwing up pale yellow-green tufts of feathery leaves from a short, thick, creeping stem, and bearing at the base of its leaves its great head of nuts, of which millions were floating on the water and germinating in the mud." Dr Guppy has recently sent it from the Solomon Islands.

Calamus sp.

Fruits and a cluster of the spines from the rhachis of a leaf in the New Guinea drift. The fruit was decayed, and contained no seed.

PANDANEÆ.

Pandanus spp.

New Guinea drift.

There are no specimens in the collection, but Moseley (Notes by a Naturalist, p. 433) mentions that he observed the seeds of two species.

Besides the foregoing more or less correctly determined seeds and seed-vessels from the New Guinea drift, there are several which we cannot refer even to their natural orders.

SEEDS AND SEED-VESSELS FROM THE SEA-BEACH OF THE ARROU ISLANDS.

DIPTEROCARPEÆ.

Vateria papuana, Dyer, *ante*, p. 123.

Sea-beach, Arrou.

It is uncertain whether this grows in these islands or was accidentally washed ashore; but Beccari (Nuovo Giornale Botanico Italiano, v. 1873, p. 330), in a sketch of the Flora, says it is singular that the Dipterocarpeæ are absent. See also p. 287.

STERCULIACEÆ.

Heritiera littoralis, Dryander.

Sea-beach, Arrou.

This was also found in the New Guinea drift. See p. 288.

MELIACEÆ.

Flindersia amboinensis, Poir. ? (Plate LXIV., C.)

Flindersia amboinensis, Poir. in Lam. Encycl. Method. Suppl., iv. p. 650 ?

Sea-beach, Arrou.

The genus *Flindersia* comprises about six Australian species, and one has recently been discovered in New Guinea. Possibly the capsule represented in our plate belongs to a species distinct from the Amboina one, which is figured by Rumphius (Herb. Amb., iii., p. 201, t. 129). His figure of the seed-vessel, which is reduced, represents it tapering much more at both ends than ours is. *Flindersia oxleyana*, from the Brisbane River, in Queensland, is also very near the present, which, though picked up on the beach, was probably not stranded there, but grew in the island. The capsule is not water-worn, and the fragile seeds are in a good condition.

This ought to have been included in the preceding list of the plants of the South-eastern Moluccas; but it was overlooked, as there was no Herbarium specimen.

APOCYNACEÆ.

Cerbera odollam, Gærtn.

Sea-beach, Arrou.

The distribution and other particulars of this plant will be found at pp. 164 and 293.

PALMÆ.

Orania aruensis, Beccari. (Plate LXV., I.)

Orania aruensis, Beccari, Malesia, i. p. 76.

Sea-beach, Arrou.

Only the one germinating seed represented in our plate was collected. Dr Beccari furnished the name from a drawing we forwarded to him. This palm was described from specimens collected in the island of Wokan, one of the smaller islands of the Arrou group, where it inhabits very dense, often inundated forests. In a paragraph, *loc. cit.*, p. 9, on the distribution of palms, Dr Beccari calls attention to the fact that the fruits or seeds of very few palms are adapted for wide dispersion. Some, he says, like *Cocos nucifera* and *Nipa fruticans*, are able to resist the action of salt water; and he had also observed that the fruits of *Orania* are often thrown up uninjured from the sea. "Ho osservato che anche i frutti di *Orania* sono spesso rigettati intatti dal mare." But what is more extraordinary, he states that the cassowaries often swallow the fruits of palms which are in no wise fleshy, and carry them considerable distances. In the Arrou Islands, for instance, he saw heaps of the seeds of *Orania aruensis* in their excrement, yet every one was from 55 to 60 millimetres in diameter—that is, from about $2\frac{1}{4}$ to $2\frac{1}{2}$ inches; the one represented in Plate LXV. is barely $2\frac{1}{4}$ inches in diameter. Of course, although this be the case, the cassowaries could only assist in the local dispersion of the species. It is certainly remarkable how very local the majority of palms are.

GNETACEÆ.

Gnetum rumphianum, Beccari. (Plate LXIV., D.)

Gnetum rumphianum, Beccari, Malesia, i. p. 182.

Funis gnemoniformis, Rumph., Herb. Amboin., v. p. 11, t. 7.

Sea-beach, Arrou.

We are also indebted to Dr Beccari for the determination of this seed, of which there are several in the collection. In all cases, the outer fleshy envelope of the seed has disappeared, leaving bare the second envelope, which is crustaceous and traversed longitudinally by about fifteen prominent ribs, and is free from the body of the seed except at the base. As shown in the plate, the seeds have begun to germinate by breaking through the apex of this second envelope, which, being free from the body of the seed within and splitting longitudinally, might easily be mistaken for a pericarp. None of the seeds is in a sufficiently advanced stage of germination to enable us to fully explain the mode, which is certainly very singular, and apparently essentially the same as in *Gnetum gnemon*, as described by Bower (Quarterly Journal of Microscopical Science, N. S. xxii. p. 278, t. 25). In the latter the seed is about a quarter the size of ours. The

bulk of the seed of *Gnetum rumphianum* consists of very hard, almost horny albumen, with a small axile embryo. According to Bower the embryo of *Gnetum*, or at least of *Gnetum gnemon*, is not formed until after the seed falls from the parent, but is a development of the seed immediately preceding active germination. In *Gnetum gnemon* there is a lateral outgrowth of the hypocotyledonary part of the embryo growing in such a manner that the rest of the embryo is pushed out from the cavity of the albumen in which it is formed, and develops in the ordinary way, being nourished by the albumen conveyed to it through the lateral outgrowth or "feeder," as it is called. In *Gnetum rumphianum*, judging from the more or less mutilated specimens before us, a cluster of rootlets is given off close to the point at which the protruded part of the embryo emerges; this may have been caused through injury to the primary rootlet, or it may be normal. There is also what we take to be a long, relatively stout hypocotyledonary stem, at the apex of which are the scars of the two cotyledons.

Whether these seeds were washed ashore, or produced by plants growing in the island, is uncertain, but the fact remains that they were picked up on the beach in a germinating condition. Dr Beccari, *loc. cit.*, states that it is apparently common in New Guinea, occurring also in the Arrou Islands, and that he had found the fruit of it in the Celebes. This species, which has been confused with *Gnetum scandens* and others, is easily distinguished from its congeners by the intermediate coat of the seed being ribbed.

Gnetum sp.

Sea-beach, Arrou Islands.

A single seed undoubtedly of this genus, but we are unable to determine the species. It has a smooth secondary envelope.

SEEDS STRANDED AT PALISADOES PLANTATION, JAMAICA.

GUTTIFERÆ.

Calophyllum calaba, Linn.

Calophyllum calaba, Linn.; Jacq., Sel. Stirp. Amer., p. 269, t. 165; Griseb., Fl. Brit. W. Ind., p. 108; Descourt., Fl. Antill., ii. p. 30, t. 74.

Sea-shore, Palisadoes Plantation, Jamaica. Seeds apparently quite sound.

Grisebach states that this tree is common in mountain woods in the West Indies, while Descourtilz says that it inhabits sandy sea-shores, which is more probable, though it may, like *Calophyllum brasiliense*, grow far inland as well as on the sea-shore. Grisebach gives the range of *Calophyllum calaba* as "Cuba to Brazil;" but we have only seen West Indian specimens. It is, however, generally spread there from Cuba to Trinidad. There is a specimen in the Kew Herbarium from the Bahamas, collected by Mr Brace, who notes that it was introduced. It is also planted in the Bermudas.

MELIACEÆ.

Carapa guyanensis, Aubl.

Carapa guyanensis, Aubl., Pl. Guian., iv. t. 387; Griseb., Fl. Brit. W. Ind., p. 131; Oliver, Fl. Trop. Afr., i. p. 336.

Sea-shore at Palisadoes Plantation, Jamaica.

The fruit and seeds of this are rather smaller than those of *Carapa moluccensis*, and although the seeds are not albuminous, the large embryo is very oily. This species inhabits the West Indies, Central America, and Eastern Tropical South America, mostly growing in maritime districts.

ANACARDIACEÆ.

Spondias sp.

Sea-shore at Palisadoes Plantation, Jamaica.

This is probably the Hog-plum (*Spondias lutea*, Linn.), which is common, both wild and cultivated, in many parts of Tropical America and the West Indies, and also on the western coast of Tropical Africa. The fruit is drupaceous, with a bony endocarp.

LEGUMINOSÆ.

Mucuna urens, DC.

Mucuna urens, DC.; Griseb., Fl. Brit. W. Ind., p. 198; Oliver, Fl. Trop. Afr., ii. p. 185; Mann in Proc. Amer. Acad., vii. p. 164; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 106; Seem., Fl. Vit., p. 59.

Sea-shore at Palisadoes Plantation, Jamaica.

This species is widely dispersed in Tropical America, yet Grisebach states that it is uncommon in Jamaica; it is also recorded from the Sandwich and Marquesas Islands; and there are specimens in the Kew Herbarium from various points on the western coast of Tropical Africa. We have seen no Polynesian specimens, but there seems no reason to doubt the records, for the species is easily distinguished. Jouan states that he found a few plants of it in the island of Hiwaoa, Marquesas, but he never saw it in Nukahiva.

Mucuna pruriens, DC.

Mucuna pruriens, DC.; Griseb., Fl. Brit. W. Ind., p. 198; Oliver, Fl. Trop. Afr., ii. p. 187; Seem., Fl. Vit., p. 59; Forst., Fl. Ins. Austr. Prodr., p. 50.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the Leguminosæ sometimes washed ashore on the western coast of Europe. It is much more widely dispersed than *Mucuna urens*, though hitherto it has neither been found in Australia, nor in Polynesia, so far as we are aware; and Seemann states that there is no specimen or drawing in the British Museum of the plant from the Tongan Islands named "*Dolichos pruriens*, Linn.?" by Forster.

Ecastaphyllum brownei, Pers.

Ecastaphyllum brownei, Pers.; Oliver, Fl. Trop. Afr., ii. p. 236; Chapman, Fl. Southern U.S., Suppl., p. 617.

Sea-shore at Palisadoes Plantation, Jamaica.

A shrub or small tree inhabiting maritime districts from South Florida and Central America, through the West Indies to Brazil, as well as Western Tropical Africa. It has a one-seeded flat pod, from three-quarters to one inch in diameter, and very light. The seeds of this stranded in Jamaica, like most of those collected by Mr Morris, appeared quite sound when they were received.

Cæsalpinia bonduc, Roxb.

Cæsalpinia bonduc, Roxb.; Hook. f., Fl. Brit. Ind., ii. p. 255; Seem., Fl. Vit., p. 66; Mann in Proc. Amer. Acad., vii. p. 164.

Guilandina bonduc, Linn.; Griseb., Fl. Brit. W. Ind., p. 204.

Sea-shore at Palisadoes Plantation, Jamaica.

This species, which is often confounded with the next, may be distinguished, among other things, by its yellow seeds; whereas those of *Cæsalpinia bonducella* are slate or lead coloured. It is by no means so generally dispersed as *Cæsalpinia bonducella*, being unknown from Africa and Australia. There are specimens in the Kew Herbarium from Key West, Florida; from Cuba, Jamaica, Antigua, St Vincent, and Martinique, in the West Indies; from Maisor, Ceylon, various parts of the Malayan Peninsula, and Java, in Asia, and from Norfolk Island and the Fijis in Polynesia.

Cæsalpinia bonducella, Fleming.

Cæsalpinia bonducella, Fleming; Hook. f., Fl. Brit. Ind., ii. p. 254.

Sea-shore at Palisadoes Plantation, Jamaica.

The seeds of this species are commonly thrown up by the waves in various parts of the world, including the coast of Western Europe. There are also specimens in the Kew Museum that were washed ashore in Kaffraria, Tristan da Cunha, and St Helena. In Part II., p. 80, the seeds of this species washed ashore in St Helena are incorrectly referred to as *Cæsalpinia bonduc*. The general distribution of *Cæsalpinia bonducella* will be found at p. 145 of the present part of the Botany of the Challenger Expedition. Among remote islands, which it certainly or probably reached through the agency of the sea, we may name the Bermudas, St Helena, and the Keeling Islands. Sir John H. Lefroy (Botany of Bermuda, p. 68) says that it was found in one place in the Walsingham tract, in 1874, and it was then in flower. In St Helena, according to Melliss (St Helena, p. 263), the seeds are frequently washed ashore on the beach at Sandy Bay; but he had not met with an instance of their having germinated. Darwin (Journal of Researches, ed. 1884, p. 454) specially mentions finding a *Guilandina* on one of the islets of the Keeling group.

Comparatively fresh seeds of *Cæsalpinia bonducella* and of *Cæsalpinia bonduc* were tried at Kew, to see whether they would float in salt water, and the former floated, while the latter sank. Older seeds of the two species were tried with the same result, though the seeds of *Cæsalpinia bonduc* settled down very slowly, and might perhaps float on water of the specific gravity of the Atlantic. Whether the very light pod retains the seeds for any length of time after immersion in water we have been unable to ascertain.

Cassia fistula, Linn.

Cassia fistula, Linn., Amœn. Acad., viii. p. 3; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 514; Oliver, Fl. Trop. Afr., ii. p. 270, *in nota, sub. Cassia sieberiana;* Griseb., Fl. Brit. W. Ind., p. 206.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the seeds, already alluded to, recorded by Linnæus as having been thrown up on the coast of Norway in a living condition; and Professor Martins (Bull. Soc. Bot. France, iv. p. 326) states that he had seen seeds which were cast ashore in the south of France germinate perfectly. In the latter case the seeds were still in the pod, and most likely this is usually the case, for the pod is indehiscent and breaks up very tardily. This pod is cylindrical, and from one to two feet long, with numerous seeds separated from each other by transverse partitions. *Cassia fistula* is now very widely diffused in warm countries, both in a wild and cultivated state; but it doubtless owes its present wide area to man rather than any other agency. Bentham treats it as indigenous in Asia, and as possibly so in Africa.

Dimorphandra mora, Benth.

Dimorphandra mora, Benth. in Benth. et Hook. f., Gen. Plant., i. p. 588.
Mora excelsa, Benth. in Trans. Linn. Soc. Lond., xviii. t. 16; Griseb., Fl. Brit. W. Ind., p. 216.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the finest and commonest forest trees of British Guiana, and it has also been collected in Trinidad; but it is unknown from elsewhere. Only an empty pod was stranded in Jamaica. The seed of *Dimorphandra mora* is one of the largest of the dicotyledonous class, and its embryo is one of the largest in the vegetable kingdom, being sometimes as much as four and a half inches across the broadest part, in striking contrast to the small embryo of such large monocotyledonous seeds as the cocoa-nut. But this is far surpassed by an undescribed[1] species in the Kew Herbarium, collected by Sutton Hayes in the swamps of the Rio Grande, Panama. An embryo of this, preserved in spirit, and therefore perhaps a little swollen, measures fourteen inches round, and six and a half inches across in the widest part. This is probably the largest embryo in the vegetable kingdom.

[1] *Dimorphandra oleifera*, Triana MSS. in Herb. Kew. *Dimorphandræ moræ* affinis, a qua differt foliolis bijugis oblongo-lanceolatis longe acuminatis, spicis lateralibus subsolitariis, legumine semineque multo majori.

Entada scandens, Benth.

Entada scandens, Benth. in Trans. Linn. Soc. Lond., xxx. p. 363.

Sea-shore at Palisadoes Plantation, Jamaica.

It has already been mentioned in the Introductory Notes to this Part that the large seeds of this plant are commonly cast ashore on various parts of the western coast of Europe, and plants have been raised at Kew from seeds picked up in the Azores. As limited by Bentham, this includes the proposed species *Entada gigalobium*, DC., *Entada pursætha*, DC., *Entada monostachya*, DC., *Entada adenanthera*, DC., *Entada rheedii*, Spreng., *Entada parrana*, Spreng., *Entada gandu*, Hoffm., and *Entada rumphii*, Scheff. It is generally diffused in Tropical Asia, Africa, and America, and it has also been found in North-Eastern Australia. It grows also in some parts of Polynesia, as the Fiji and Samoan Islands, but being a climber it only flourishes associated with shrubby or arboreous vegetation. Seemann states that it is common in the mangrove forests all over Viti. Mr J. F. Arundel sent to Kew seeds stranded on Flint Island, South Pacific. Melliss (St Helena, p. 266) states that the seeds of this plant are commonly cast ashore on the windward side of St Helena, where they have been known to germinate and grow into plants of considerable size. Schweinfurth (The Heart of Africa, ii. p. 62) states that seeds have been observed on the northern shores of Nova Zembla. The pods vary in size, but they are always very large, and sometimes they are as much as four or five feet in length by four or five inches in width, yet the branches of the plant are comparatively slender.

CUCURBITACEÆ.

Fevillea cordifolia, Linn.

Fevillea cordifolia, Linn.; Griseb., Fl. Brit. W. Ind., p. 289; Descourt., Fl. Antill., iii. p. 216, t. 198.

Sea-shore at Palisadoes Plantation, Jamaica.

A tall climber with a globose fruit, from four to five inches in diameter, containing a few lenticular seeds about two inches across, and three-quarters of an inch thick. It is very widely spread in Tropical America and the West Indies; and the seeds sent by Mr. Morris look quite sound.

CONVOLVULACEÆ.

Ipomœa pes-capræ, Sweet.

Sea-shore at Palisadoes Plantation, Jamaica. See Part III., p. 169 (*Ipomœa biloba*).

EUPHORBIACEÆ.

Omphalea diandra, Linn.

Omphalea diandra, Linn.; Griseb., Fl. Brit. W. Ind., p. 50; DC., Prodr., xv. 2, p. 1135.

Sea-shore at Palisadoes Plantation, Jamaica.

This plant is of climbing habit, reaching the tops of the highest trees (Sutton Hayes

MSS. in Herb. Kew); and it is widely dispersed in the West Indies and Central and South America, often on river-banks, and sometimes far inland, but also near the sea, for Seemann's specimen from Panama is labelled "*in maritimis.*" It has the ordinary three-celled and three-seeded fruit of the order, but it is of large size and fleshy, and the subglobose seeds are as much as one inch and a half in diameter, and the large embryo with foliaceous cotyledons is enclosed in a large quantity of oily albumen.

JUGLANDEÆ.

Juglans sp. ?

Sea-shore at Palisadoes Plantation, Jamaica.

The genus *Juglans* is widely dispersed in the northern hemisphere, and three or four species occur in Mexico. The present fruit may belong to the genus *Carya*, which is restricted to North America, including Mexico.

PALMÆ.

Manicaria saccifera, Mart. ?

Sea-shore at Palisadoes Plantation, Jamaica.

The number of species of *Manicaria* known is two or three, but the distribution of *Manicaria saccifera*, Mart., and *Manicaria plukenetii*, Griseb. and Wendl. (Fl. Brit. W. Ind., p. 518), assuming that they are really different species, is nowhere fully recorded. Plukenet (Almagestum Botanicum, ii. p. 278), under *Palmapinus maritima barbadensis et jamaicensis*, has the following note concerning the fruit of *Manicaria saccifera*: "Perrarum hunc fructum externo cortice denudatum habuimus ex Insula Barbados nomine The Sea Apple: quem exindè admirabilem ejus externum involucrum adhuc retinentem, Insula Jamaicæ a se collectum, amice nobis ostendebat D. D. Hans Sloane." And Sloane (Natural History of Jamaica, ii. p. 186) says in allusion to the same fruit: "This is frequently cast up by the waves on the shores of this island, and is one of those fruits thrown on the north-west islands of Scotland by the currents and seas." Whether the palm which bears this fruit grows in either Jamaica or Barbados or not, is uncertain; but Grisebach had seen no specimens from the former island, and the name is not in Maycock's Flora Barbadensis, and there are no specimens from either place in the Kew Herbarium. Still, so much remains to be done in relation to the distribution of palms, that it is quite possible it may exist in Jamaica, at least. Be that as it may, *Manicaria saccifera* is essentially a maritime palm. Martius (Hist. Nat. Palm., ii. p. 141) says: "Crescit pulcherrima Palma in sylvis densis aqua dulci vel subsala inundatis, ad ripas fluminum Amazonum, Tocantius, Acará aliorumque, in canali Tagipurú, in insulis depressis Marajo, Caviana reliquisque omnibus per ostia maritima fluminum Paraënsium sparsis; in interioribus terræ continentis non reperta." The seeds sent by Morris are unsound.

Astrocaryum sp.

Sea-shore at Palisadoes Plantation, Jamaica.

Astrocaryum is a Tropical American genus of perhaps thirty species, but we find no record of any species growing in Jamaica. One species occurs in Trinidad.

RECORDS OF VARIOUS DRIFTED SEEDS GERMINATING AFTER BEING CAST ASHORE.

MALVACEÆ.

Hibiscus tiliaceus, Linn.

Hibiscus tiliaceus, Linn.; Griseb., Fl. Brit. W. Ind., p. 86 (sub. *Paritio*); Seem., Fl. Vit., p. 18.

According to Sir J. H. Lefroy (Bot. Berm., p. 52), this was raised from seed washed ashore in the Bermudas about fifty years ago. It is found on nearly all tropical shores.

AMPELIDEÆ.

Vitis vinifera, Linn.

Vitis vinifera, Linn.; Lefroy, Bot. Berm., p. 61.

Sir J. H. Lefroy says: "An interesting example of the diffusion of plants was afforded by the foundering of the ship 'Minnie Breslauer,' on January 6, 1873, on the south shore. She had a cargo of white Lisbon grapes, many of which were washed on shore, and the seeds germinated at high-water mark. Numbers of plants were, from curiosity, taken up and transplanted, some of which bore fruit in 1876."

SAPINDACEÆ.

Sapindus saponaria, Linn.

Sapindus saponaria, Linn.; Griseb., Fl. Brit. W. Ind., p. 126; Seem., Fl. Vit., p. 47; Jones, Naturalist in Bermuda, p. 190; Forst., Fl. Ins. Austr. Prodr., p. 29.

This common West Indian and South American tree is said to have been raised from seeds washed up on the south shore of the Bermudas. Seemann, *loc. cit.*, says: "I have examined Forster's original specimen of this from Easter Island, preserved at the British Museum, as there was some doubt expressed about its belonging to this species, and, as far as it goes, I find it absolutely identical with the American specimens. Jouan (Mém. Soc. Sci. Nat. Cherbourg, 1865, p. 102) states that *Sapindus saponaria* is very common in the Marquesas, though he does not seem satisfied that it was the same as the West Indian plant, for he poses the question: "Est-ce la même espèce qu' aux Antilles, et comment est-elle venue aux Marquises?" There is no *Sapindus* in the Kew Herbarium from

Polynesia eastward of the Fijis, where there is an endemic species (*Sapindus vitiensis*, Seem.), except in the Sandwich Islands, where there is also an endemic species (*Sapindus oahuensis*, Hildebr.), which is remarkable for its simple leaves. If the Easter Island and Marquesas *Sapindus* be really *Sapindus saponaria*, it is possible that it was carried thither by oceanic currents. But there are two or three Asiatic species so closely allied to *Sapindus saponaria* that the identity of the insular one cannot be satisfactorily settled in the absence of perfect specimens. The fruit of these species is fleshy and indehiscent; and the seed has a very dense, hard testa, capable of protecting the embryo from water for a long period. It is exalbuminous, and the embryo has large fleshy cotyledons.

ANACARDIACEÆ.

Anacardium occidentale, Linn.

Anacardium occidentale, Linn.; Griseb., Fl. Brit. W. Ind., p. 177.

This is not among the stranded fruits in the Kew Museum, but it is one of those enumerated by Linnæus (Amœn. Acad., viii. p. 3) as being cast ashore on the coast of Norway with the seed still in a living condition. Whether the seed-vessel alone, or attached to its enormous fleshy peduncle, was washed up, we are not informed. It is a common Tropical American tree, and is now naturalised in most other hot countries.

EUPHORBIACEÆ.

Aleurites moluccana, Willd.

This is one of the seeds enumerated by Chamisso as being cast upon the coast of Java in a germinating condition. The large seed contains a considerable quantity of albumen, but the embryo is protected by a very dense, woody testa.

Ricinus communis, Linn.

Ricinus communis, Linn.; Darwin, Journal of Researches, ed. 1884, p. 455.

Darwin mentions this, on the authority of Mr A. S. Keating, as one of the seeds cast ashore in the Keeling Islands; but it is not one of which he obtained specimens. It is one of the few plants observed by Dr Copeland in South Trinidad, where, like *Canavalia obtusifolia*, it may possibly have been carried by the waves. It is one of a number of plants, of which a list is given at p. 282, which Professor Martins succeeded in raising from seed that had been floating ninety-three days on the surface of the sea. Like *Aleurites*, it has albuminous seeds, and they are furnished with a very dense, crustaceous testa.

ORCHIDEÆ.

As an instance of what may be effected by the agency of the sea, Moseley (Notes by a Naturalist, p. 368) says: "On the shores of Little Ki Island I found on the beach, above the ordinary reach of the waves, a large mass of the pseudo-bulbs of an epiphytic orchid with its roots complete. It was partly buried at the foot of a tree, and seemed quite lively. It had evidently been washed up in a storm."

PALMÆ.

Cocos nucifera, Linn.

Notwithstanding the fact that the cocoa-nut palm is essentially a littoral tree, is now almost cosmopolitan in the tropics, and the further fact that its seeds or fruit will bear long immersion in sea-water without detriment, it is doubtful whether oceanic currents have played an active part in its diffusion. It is possible, and indeed very probable, that its present wide area is partly due to this agency. For example, the Keeling or Cocos Islands, in the Indian Ocean, do not appear to have been inhabited before 1827, when some Europeans settled there for the express purpose of exporting the products of the cocoa-nut palm, which abounded there. Darwin (Journal of Researches, ed. 1884, pp. 453, 454) states that at first sight the cocoa-nut tree seems to compose the whole wood, and the whole prosperity of the place depends upon it. He also mentions that young and full-grown cocoa-nut trees grew intermingled; so that there can be no doubt of its capability of reproducing itself abundantly unassisted in favourable situations. Another instance may be Cocos Island, off the coast of Central America, in the Pacific; yet it is strange that the cocoa-nut does not exist in the not far distant Galapagos, which lie in the course of currents running from America, and where, according to Collnett, as cited by Darwin (*loc. cit.*, p. 392), various seeds and seed-vessels are washed ashore. Moseley (Notes by a Naturalist) mentions in several places the paucity, or absence, of the cocoa-nut in certain uninhabited islands of the Molucca Sea. And Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 127) has the following observations on the distribution of the cocoa-nut in connection with the vegetation of the Marquesas Islands. "Too much has been made, I think, of the influence of oceanic currents in the dispersion of the cocoa-nut, or at least to their unaided influence. The waves may well, as Forster says, and as may be seen every day, have washed ashore cocoa-nuts, which may have germinated, as any kind of soil suits it; but, as I have explained elsewhere, the cocoa-nut tree produces itself with difficulty unassisted. The nuts fall to the ground, where the greater part of them perish without germinating. It is necessary to bury them, or at least to fix them to the soil." He further states, that, according to current traditions, the cocoa-nut was planted in certain islands in the Pacific by the hand of man, while in others it is known to be of recent introduc-

tion. Of course, the waves of the sea may sometimes bury the cocoa-nut as well as cast it ashore. Moreover, under certain conditions, the cocoa-nut may germinate freely without being buried or partially buried, or even without being fixed to the soil. See Tonning's reference to the cocoa-nuts being cast ashore in Norway, *ante*, p. 277.

Sagus sp.

At Malanipa Island, off the coast of Mindanao, Philippines, Mr Moseley found a young sago-palm, which was just beginning to form a stem, washed up just above the ordinary beach-line, and firmly rooted, though in an inclined position, and growing vigorously (Notes by a Naturalist, p. 368).

FRUITS AND SEEDS TAKEN FROM THE CROPS OF FRUIT PIGEONS, SHOT IN THE ADMIRALTY ISLANDS.

In Mr Moseley's Notes, reproduced at p. 229, he records some observations on the part played by carpophagous birds in the dissemination of plants. The collection of fruits he mentions having taken from the crops of a number of a Fruit Pigeon (*Carpophaga rhodinolæma* [1]) contains about a dozen species, of which we have identified :—

Elæocarpus sp.

This fruit is the most numerous of all, and perhaps the least nutritious. Within the thin fleshy coat is an exceedingly hard five-celled indehiscent endocarp. The species of *Elæocarpus* are numerous in Tropical Asia, and a few inhabit Polynesia, Australia, and New Zealand.

Soulamea amara, Lam.

Soulamea amara, Lam., *ante*, p. 235 ; Ann. Wiener. Mus., i. t. 16.

A single empty fruit. This plant is in Dr Guppy's collection from the Solomon Islands, lately received at Kew. It is the *Rex amaroris* of Rumphius (Herb. Amboin., ii. p. 129, t. 41).

Rourea ?

Only one small undeveloped worm-eaten fruit. One species of *Rourea* has been found in the Fijis, and one in North Eastern Australia.

Rubiacea ?

The mericarps, as well as the entire fruits of what we regard as a member of the Rubiaceæ, are, next to the *Elæocarpus*, the most numerous in the collection. We have not been able to determine the genus.

[1] Narr. Chall. Exp., vol. i. p. 566, *et passim*, 1885.

Myristica sp.

The nutmegs are all probably of one species, and the pericarp has quite disappeared in all cases, yet the seeds appear to be sound.

Laurineæ.

There are two different exalbuminous seeds, with large hemispherical cotyledons, which probably belong to this order.

Phyllanthus sp. ?

A single fruit.

Clinogyne grandis, Benth. et Hook. f.

One fruit of this scitamineous plant, which is common in the region.

Gnetum spp.

There are several fruits of two distinct species of this genus, neither of which we can match. They are both large fruits, and oblong in shape, the larger being one inch and a quarter long in its present condition, and two inches and a half in circumference. The albumen of these seeds is exceedingly hard, and cuts like resin.

There are two fruits of another genus, the affinities of which we have failed to discover.

Other records of various fruits being found in the crops of pigeons are:—

Baron Mueller (Vegetation of the Chatham Islands, p. 14) states that a large pigeon finds plentiful food on the fruit of the Karaka tree (*Corynocarpus lævigata*, Forst.), a common tree in New Zealand, especially near the sea; but found nowhere else except in the Chatham Islands, where, however, it is said to form the largest part of the forest. And Wallace (Malay Archipelago, ii. p. 61) mentions that the fleshy outer covering of the Kanari (*Canarium commune*) is the favourite food of the great green pigeons (*Carpophaga perspicillata*) of Batchian. This tree is widely dispersed in Tropical Asia, but it is cultivated only in some parts. In the Journal and Proceedings of the Royal Society of New South Wales, xvii. p. 226, Dr Guppy records finding fruits of an *Elæocarpus* and a palm, probably a species of *Kentia*, in the crops of pigeons shot on a small island off the coast of San Christoval, Solomon Islands. In the Kew Museum are fruits of *Oncocarpus vitiensis*, A. Gr., from the gizzard and crop of *Carpophaga latrans* in the Fijis, presented by Professor Garrod; the fruit of *Gnetum gnemon?* from the crop of a fruit pigeon in New Guinea, and a species of *Ficus* from the same source, in Mysore, presented by W. A. Forbes, Esq.

ON THE

VEGETABLE DRIFT, AND ON THE DISPERSAL OF FRUITS AND SEEDS IN THE ISLANDS OF BOUGAINVILLE STRAITS, IN THE SOLOMON GROUP.

Compiled from the Notes and Collections made by H. B. GUPPY, M.B., F.G.S., during 1883 and 1884, while Serving on Board H.M.S. "Lark."

Just as we were on the point of finishing the examination of the collections of drift seeds, &c., made by Mr Moseley and others, Dr H. B. Guppy, R.N., arrived in England from the Solomon Islands, bringing with him considerable botanical collections, which he has presented to Kew. Among other things is a quantity of drift seeds and seed-vessels, and also others taken from the crops of carpophagous birds, shot by Lieutenant T. H. Heming and Lieutenant A. Leeper of H.M.S. "Lark." As this collection affords additional evidence of the influence of oceanic currents and birds in the dissemination of plants, a brief review of it follows, together with Dr Guppy's observations made on the spot, which he kindly communicated, with his permission and wish that any information they contained might be embodied in this Report. The names of the plants are substituted for the numbers cited by Dr Guppy, and two or three other slight alterations have been made. A list of the seeds and seed-vessels identified follows :—

Vegetable Drift.—Lines of vegetable drift, intermingled with floating pumice, are frequently observable whilst cruising among the islands of the Solomon group. Amongst the floating fruits, those of *Barringtonia speciosa* and *Calophyllum inophyllum* are commonly found; and on more than one occasion, solitary fruits of the former were noticed at sea at a distance of 130 to 150 miles to the southward of the group, being probably derived from one of the islands of the New Hebrides to the eastward. Other fruits occurring frequently in the drift are those of *Nipa fruticans*, and of two or more species of *Pandanus;* numerous beans (species of *Mucuna, Canavalia, Dioclea*), the long germinated seeds of mangrove (*Rhizophora*), an occasional cocoa-nut, the cones of *Casuarina equisetifolia*, which is a common sea-shore tree, *Terminalia* spp., &c. On a small, bare, sandy islet or sand-key situated on a reef in Bougainville Straits, I observed thirty different kinds of seeds and fruits, which are only washed over the bank at spring tides. These belong to characteristic littoral plants, such as *Heritiera littoralis, Barringtonia speciosa, Pandanus* spp., *Calophyllum inophyllum, Nipa fruticans*, and *Cocos nucifera.*

The Trees of a Coral Islet.—In order to connect my notes on the dispersal of plants in this region, I will take the case of a small wooded islet, not more than a few hundred yards across, and formed on a coral reef from materials heaped up by the waves to a height of two or three feet above the usual high-tide level. On the weather margin of

such an islet, which may be termed its growing edge, the vegetation is scanty, and there are but few trees. A binding weed loosely covers a surface composed almost entirely of sand, broken shells, and coral debris with pumice; and it is on such an unproductive soil that the *Casuarina* and *Pandani* flourish. On the lee side of the islet, which is the nucleus or oldest portion, from which the islet has been gradually growing seaward with the extension of the reef, the soil contains a much larger proportion of humus, and the vegetation is not only much denser, but is of a different character. Here, the trees form a thick belt, their branches overhanging the rising tide. The commoner kinds are: *Barringtonia speciosa, Calophyllum inophyllum, Thespesia populnea, Hibiscus tiliaceus,* together with others, such as *Cerbera odollam* and *Ochrosia parviflora.* It is worthy of note that the fruits of nearly all the trees mentioned as forming the margin of the vegetation, whether on the lee or weather side of such an islet, float in salt water. The small cones of the *Casuarina* are, however, an exception, for they sink in salt water when they are green, and require a certain amount of drying before they can be transported by the tides and currents of the sea. Just within the line of trees that immediately borders the beach, *Cycas circinalis, Pandanus* spp., *Heritiera littoralis, Terminalia* sp., and *Cerbera odollam* commonly occur. With the exception of the fruits of the *Cycas* the fruits of all these trees float in salt water, and occur abundantly in the vegetable drift. Out of ten green fruits of the *Cycas,* all but one sank in salt water, yet this exceptional circumstance sufficiently accounts for its occurrence on the coral islets. On the whole, my observations prove that the waves afford the means of dispersal of all those trees in a coral islet which line the shore, as well as of those which form a belt immediately within them.

Proceeding further in from the beach towards the centre of the islet, huge banyans and other trees having wide-spreading buttresses are met with; many of which reach a height of 150 feet and upwards, and afford a home to numbers of fruit-eating pigeons, which largely subsist on their fruits. Conspicuous amongst these trees is a species of *Canarium,* the disgorged nuts of which frequently strew the ground beneath, a banyan (*Ficus* sp.), with large oblong fruits, and another species with spherical fruits, a species of *Eugenia,* probably a variety of *Eugenia jambos,* together with several others, the fruits of which were found in the crops of pigeons shot, and a list of which is given below. The Fruit Pigeon, therefore, is doubtless an active agent in the conveyance of seeds of such trees from island to island.

The picturesquely wooded coral islets of these seas have thus been stocked through two principal agencies. Winds and currents drift to their shores the fruits and seeds of the littoral trees which ultimately form a belt, whilst the fruit pigeons disgorge the seeds or fruits of those often colossal trees which occupy the interior. The same agencies co-operate in the dissemination of the plants inhabiting the larger islands, where the littoral trees are much the same. There are wide mangrove swamps on the coast, and lines of *Nipa* palms edging the lower courses of the streams. In addition to those already mentioned, I observed that the pigeons ate several others, including the fine laurel (*Litsea* sp.) dis-

covered by me. But of the mode of dispersal of the greater bulk of the trees and shrubs with which I became familiar in my excursions I can only conjecture. Many of them possess fruits that would probably attract the fruit pigeon, which is able to swallow fruits as large even as a hen's egg. It is noteworthy that, with the exception of one species of *Areca*, no palm fruits were found in the pigeons' crops; and the fruits of most of the palms collected sink both in fresh and salt water. Of three species of *Areca* experimented upon, the fruit of only one—the common betel-nut palm—floated. Among other fruits that were observed floating were *Gomphandra* sp., a second species of *Calophyllum*, a species of *Harpullia*, and some Scitaminæ, which constitute a conspicuous feature in the vegetation of the region.

ROUGH LIST OF THE DRIFT SEEDS AND SEED-VESSELS COLLECTED BY DR H. B. GUPPY.[1]

GUTTIFERÆ.
Calophyllum inophyllum.

STERCULIACEÆ.
Heritiera littoralis.

RHAMNACEÆ.
Smythea sp.

LEGUMINOSÆ.
Canavalia sp.
Mucuna gigantea.
Mucuna sp.
Dioclea reflexa?
Dioclea sp.?
Pongamia glabra.
Pterocarpus sp.
Ecastaphyllum?
Cynometra?
Cæsalpinia nuga.
Bauhinia sp.?
Acacia sp.?

COMBRETACEÆ.
Terminalia sp.
Lumnitzera coccinea.

RUBIACEÆ.
Guettarda speciosa.

BORAGINEÆ.
Cordia subcordata.

LAURINEÆ.
Hernandia sp.

EUPHORBIACEÆ.
Excæcaria indica.

AMARYLLIDEÆ.
Crinum asiaticum.

A comparison of the foregoing list with the preceding enumeration of Mr Moseley's drift seeds and seed-vessels shows that many are the same. Few of them call for special remarks. The *Smythea* is probably *Smythea pacifica*, Seem., concerning the distribution of which little is known. The large proportion of Leguminosæ is in accord with all previous experience. *Cordia subcordata* and *Crinum asiaticum* are interesting; the large spongy tuber-like seed of the latter seemed to be quite sound when cut.

The collection of seeds and seed-vessels taken from pigeons' crops shot in the Solomon Islands by Dr Guppy consists of a dozen species, to several of which, and some others, references are made in Dr Guppy's notes. We have been less successful with these than we were with Mr Moseley's, having failed to determine the genera of half of them; but

[1] About one third of the species collected have not yet been recognised.

they will doubtless be recognised when Dr Guppy's dried plants from the same islands are compared. There are two species of *Ficus*, a *Psychotria?* a *Eugenia*, a *Premna?* and an *Areca*.

CONCLUDING REMARKS ON THE DISPERSAL OF PLANTS BY OCEANIC CURRENTS AND BIRDS.

It is hoped that the foregoing collection of facts bearing upon the dissemination of plants by oceanic currents and birds will sufficiently interest and stimulate those persons who have opportunities for observing the effects of these agencies in various parts of the world to observe and record the results of their observations. There can be no question that a large number of trees, shrubs, and herbs, many of them not essentially littoral, have been transported to distant countries by the agency of the sea, and that the area of many plants thus conveyed from place to place is only limited by climate and the nature of the shore upon which their seeds may be cast. That birds are also great seed-carriers, and assist largely in local diffusion, is equally certain, but facts are wanting to establish their reputed influence in materially widening the areas of species. Darwin fully discusses[1] the probabilities and possibilities of the occasional transport of seeds long distances by birds in various ways. "Almost every year," he states, "one or two land-birds are blown across the whole Atlantic Ocean, from North America to the western shores of Ireland and England," and he points out the possibility of small seeds being by this means conveyed long distances in mud sticking to the claws or other parts of the bird. He expresses the opinion that even if the occurrence be very rare, birds do convey seeds to vast distances, especially those of water and marsh plants. In nine grains of earth taken from the leg of a woodcock was a seed of a common rush (*Juncus bufonius*), which on trial germinated; while from the seeds contained in a ball of earth taken from the leg of a wounded partridge, no fewer than eighty-two plants, belonging to five species, were raised. In order to ascertain the probabilities of seeds being contained in the mud on the edge of a pond, three table-spoonfuls were taken from different points. "This mud weighed when dry only $6\frac{3}{4}$ ounces; I kept it covered up in my study for six months, pulling up and counting each plant as it grew. The plants were of many kinds, and were altogether 537 in number; and yet the viscid mud was all contained in a breakfast cup!"

In relation to the dispersion of plants by birds and oceanic currents Dr Beccari's[2] observations on the flora of the Arrou Islands have a special interest. He says he had no great hopes of discovering zoological novelties, but he was not prepared for the meagre flora that he found. Four months' continuous exploration yielded only between three and four hundred species of plants. Such poverty, he adds, I could not have imagined.

[1] Origin of Species, ed. i., pp. 363 and 386.

[2] Nuovo Giornale Botanico Italiano, v., 1873, p. 330.

The flora of the Arrou Islands is absolutely Papuan, and although so poor, it possesses a certain interest, because the means by which the islands were supplied with plants are evident. A large proportion of the species have fleshy fruits, which are eaten by birds, especially pigeons, which have perhaps contributed more than any other animals to the diffusion of plants. And it is noteworthy that the majority of the birds of Arrou are carpophagous. Cassowaries, too, are active agents in dissemination, for they swallow every kind of pulpy fruit, and with the swiftness of a horse convey them long distances undigested; they are also excellent swimmers, and traverse considerable expanses of water. The plants growing near the sea are spread throughout the Malayan Archipelago and New Guinea, and the fruits of nearly all are spongy or corky, and float from place to place on the surface of the water, and are cast ashore all round the coast. Some of the plants growing in the interior also have fruits of this nature, and are thus easily transported. Among plants whose seeds may be conveyed by winds only Asclepiadeæ were observed.

Setting aside the possibilities of seeds being occasionally conveyed long distances by birds at one stage, there remains the probability of a species being disseminated by birds, not necessarily of the same kind, by degrees, and in various directions. Of the kinds of seeds that might be conveyed by the sea and birds, in various ways, there seems almost no limit. The evidence afforded by the available data is far too incomplete for any generalisation; but members of the most different natural orders occur in oceanic floras, which, perhaps, more than any others, owe their existence to the agencies in question. Whether the present distribution of *Phylica nitida* (see Part II., p. 148) was brought about by the agency of birds is highly problematical. The distribution of the genus, like that of many others of the African region, points rather to a former greater land-connection. Dr H. B. Guppy, however, hazards the suggestion (Nature, xxvi. p. 12) that seeds might be transported from South Trinidad to Amsterdam Island, a distance of between 5000 and 6000 miles! One thing specially noticeable of the majority of the plants, concerning which we have certain evidence that their present areas are in part, at least, due to oceanic currents, is, that they have either exalbuminous seeds, or, if albuminous, the albumen is oily; yet Darwin proved that the seeds of various Gramineæ which have farinaceous albumen, will bear two or three months' immersion in sea-water without losing their germinative power. Another point to be considered is, whether very many of the common plants which are littoral throughout a great part of their present areas, are essentially littoral, or only accidentally so, in consequence of their seeds being conveyed uninjured to distant shores, where they are able to thrive. Some of them also occur inland, at remote distances from the sea, in localities where there is a minimum of salt in the soil, while others flourish wherever they are planted. An examination and fuller discussion of various agencies in plant dispersal will be found in our general Introduction.

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PLATE LIV.

PLATE LIV.

A small leaf and portion of the inflorescence of *Gunnera bracteata*, natural size.

Figure 1.—A flower with its subtending bracts.

„ 2.—The same divested of its bracts.

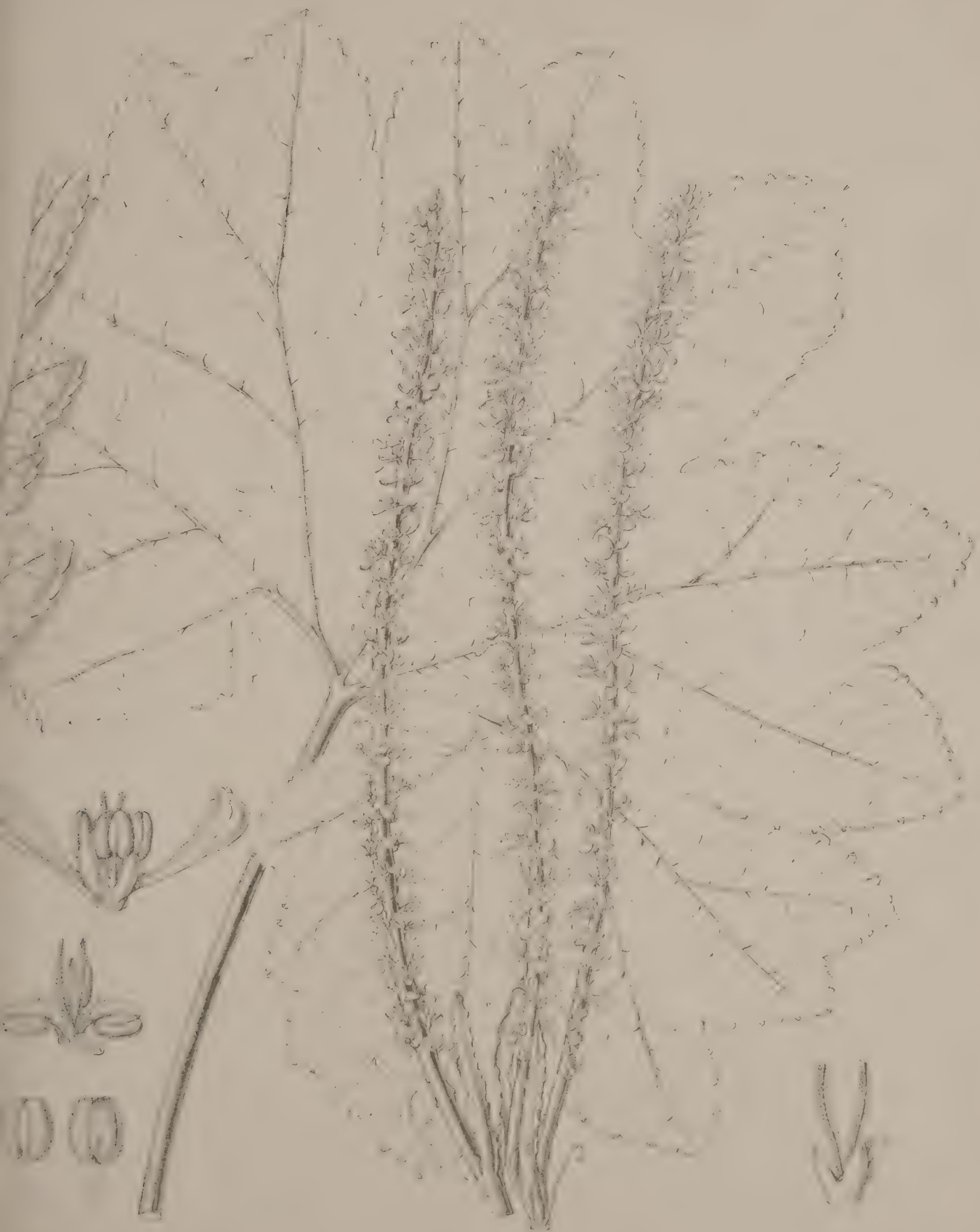
„ 3.—Back view of a stamen.

„ 4.—Front view of the same.

„ 5.—A pistillate flower : all the figures enlarged.

Drawn from a specimen in the Kew Herbarium collected in Juan Fernandez by Dr Bertero.

The flowers of the small portion of the inflorescence constituting Bertero's specimen seem to be polygamous, but no ovules could be found in the ovaries even of those without stamens. Philippi found that the spikes of this species were androgynous.



GUNNERA BRACTEATA.

PLATE LV.

PLATE LV.

A branch of *Robinsonia gracilis*, natural size.

Figure 1.—A flower-head.

„ 2.—Receptacle and portion of the involucre.

„ 3.—A bract of the involucre.

„ 4.—Portion of the receptacle, much more enlarged.

„ 5.—A ray-flower.

„ 6.—The same at a later stage; apparently sterile.

„ 7.—A disk-flower.

„ 8.—Stamens.

„ 9.—Style, with stigma: all enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Juan Fernandez by Dr Bertero.

M. Smith del. W. Gibb lith.

ROPINGCHIA GRACILIS. *Dane*

PLATE LVI.

PLATE LVI.

Wahlenbergia fernandeziana.

Figure 1.—A leaf.

„ 2.—A flower.

„ 3.—A stamen.

„ 4.—Pistil; all except figure 1 enlarged; the flower about twice natural size.

Wahlenbergia grahamæ.

„ 5.—Portion of a plant, natural size.

„ 6.—Portion of a leaf.

„ 7.—A flower from which the corolla has been removed.

Figures 8 and 9.—Stamens.

Figure 10.—Pistil; all enlarged.

Drawn from specimens in the Kew Herbarium from Juan Fernandez, collected by Mrs Graham, Dr Bertero, and Mr Moseley.

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PLATE LVII.

PLATE LVII.

A flowering branch of *Selkirkia berteroi*, natural size.

Figure 1.—Surface of leaf.

„ 2.—A flower.

„ 3.—Calyx and pistil.

„ 4.—Corolla, seen from below.

„ 5.—Corolla laid open, showing the insertion of the stamens.

„ 6.—Back view of an anther.

„ 7.—Front view of an anther.

„ 8.—Pistil.

„ 9.—Vertical section of the ovary, showing the position of the ovules during the flowering stage.

„ 10.—Ripe fruit.

„ 11.—A single nutlet.

„ 12.—A vertical section of the same, showing the position of the seed.

„ 13.—Embryo: the figures variously enlarged.

The drawing was made from specimens in the Kew Herbarium, collected in Juan Fernandez by Dr Bertero and Mr Reed; the fruit only being drawn from the specimens of the former.

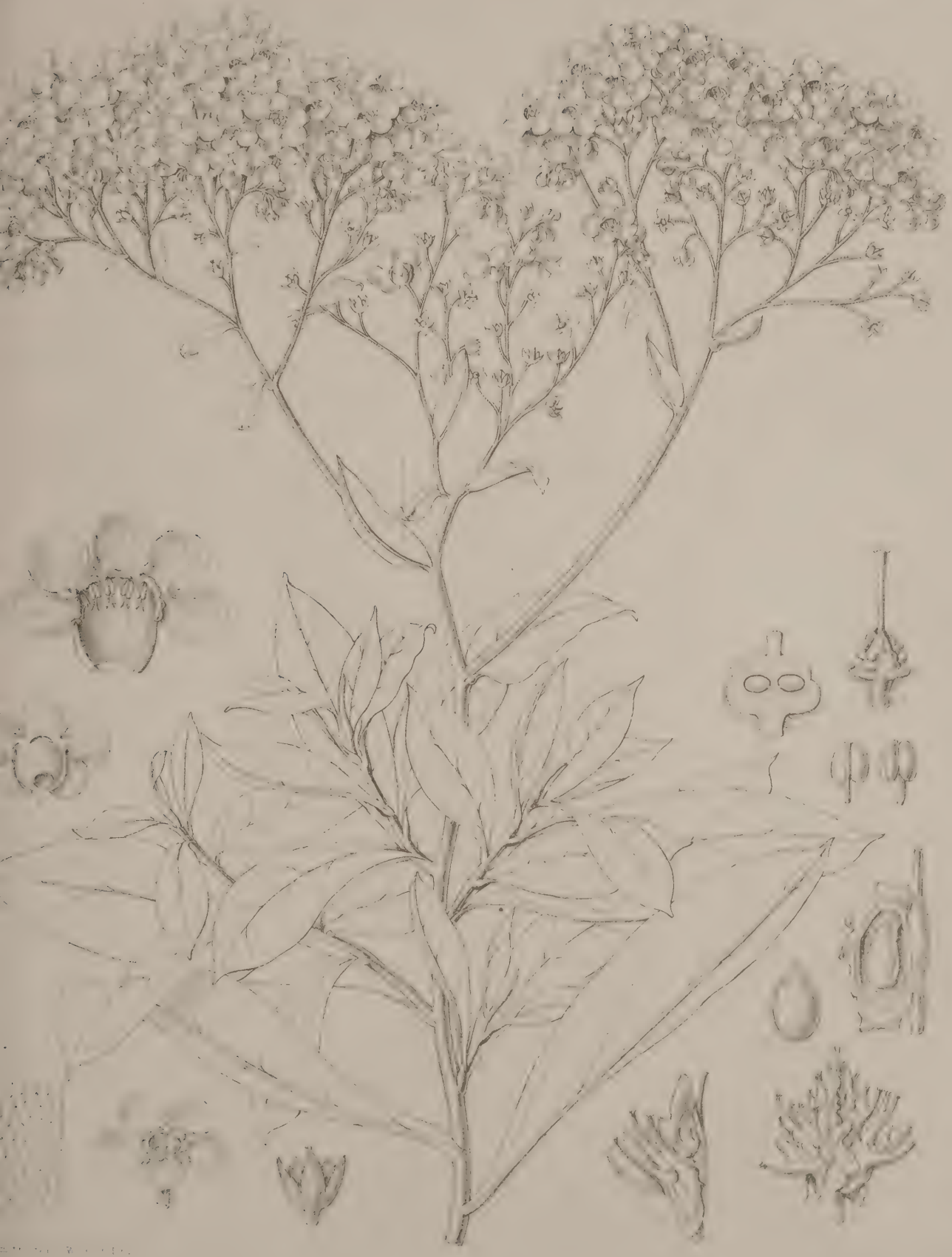


PLATE LVIII.

PLATE LVIII.

A flowering branch of *Cuminia eriantha*, natural size.

Figure 1.—Corolla of a male flower laid open, showing the stamens.

„ 2.—Style from the same.

„ 3.—A female flower.

„ 4.—The same with the corolla removed, the cilia on calyx-lobes not shown.

„ 5.—Corolla of the same flower laid open, showing the abortive stamens.

„ 6.—Pistil of the same.

„ 7.—Ripe fruit in calyx.

„ 8.—The same with the calyx removed.

„ 9.—A single nutlet: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

PLATE LIX.

PLATE LIX.

A branch of *Lactoris fernandezia*, natural size.

Figure 1.—Inflorescence.

„ 2.—A flower having six fully developed stamens and three ovaries—apparently truly hermaphrodite.

Figure 3.—A flower having six fully developed stamens and rudimentary ovaries—apparently male in function.

Figure 4.—A flower having three fully developed ovaries and no stamens—apparently female.

Figure 5.—One of the ovaries laid open, showing the position of the ovules.

„ 6.—Front view of a stamen.

„ 7.—Back view of the same.

„ 8.—Ripe fruit.

„ 9.—A seed.

„ 10.—Section of the same, showing the embryo : all the figures enlarged.

The branch and figures 1–7 drawn from a specimen in the Kew Herbarium, collected in Juan Fernandez by Mr Moseley. Figures 8–10 from a specimen collected by Dr Bertero.

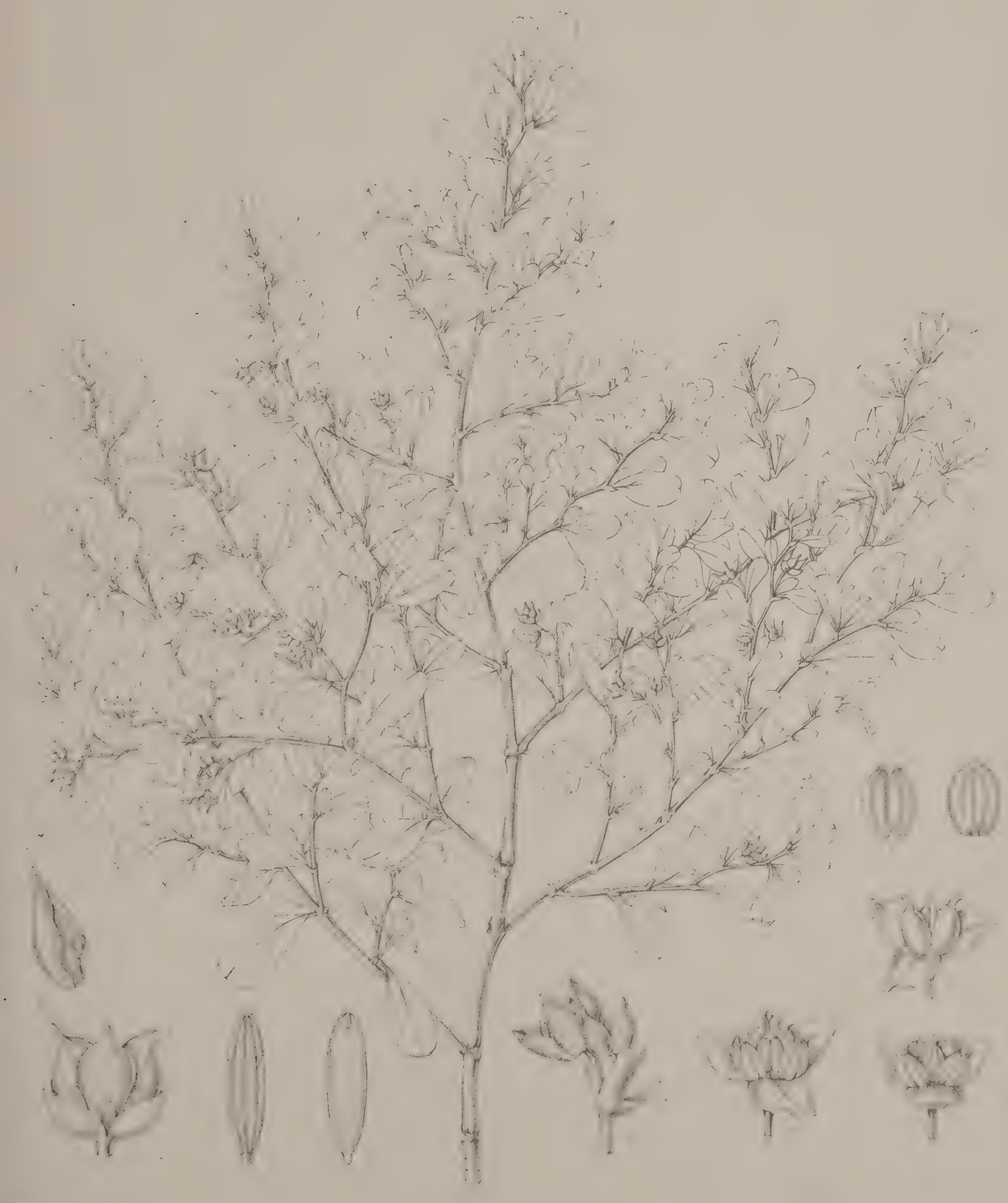


PLATE LX.

PLATE LX.

Portions of a plant of *Cladium scirpoideum*, natural size.

Figure 1.—A spikelet of the same.

„ 2.—Lowermost glume of spikelet, which is not shown on the spikelet.

„ 3.—Second glume from the base of a spikelet.

„ 4.—Pistil.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

Cladium ficticium.

Figure 5.—A spikelet.

Figures 6 and 7.—Lower glumes of the same: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Brazil by Mr Glaziou.

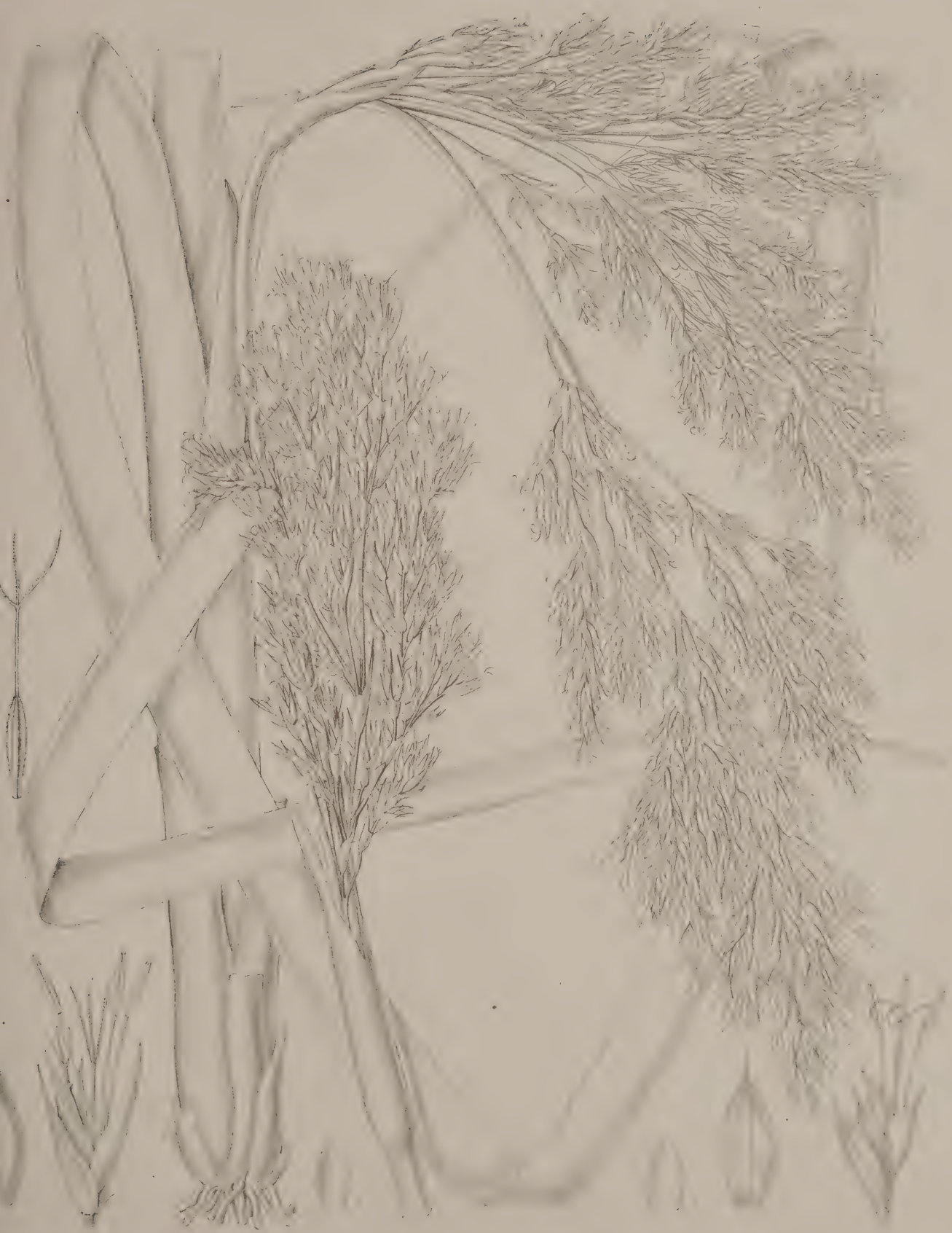


PLATE LXI.

PLATE LXI.

Portion of a plant of *Pantathera avenacea*, natural size.

Figure 1.—Portion of a leaf with ligule.

Figures 2 and 3.—The two outer empty glumes.

Figure 4.—Portion of the rhachilla bearing one floret.

„ 5.—Pale forked.

Figures 6 and 7.—Lodicules.

Figure 8.—Pistil with three styles.

„ 9.—Caryopsis enveloped in the pale.

„ 10.—Caryopsis : all the figures enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

PLATE LXII.

PLATE LXII.

Portion of a plant of *Podophorus bromoides*, natural size.

Figure 1.—Lower part of the blade and upper part of the sheath of a leaf with ligule.

„ 2.—A portion of the inflorescence.

Figures 3 and 4.—The two outer empty glumes.

Figure 5.—A floret and the elongated awn-like rhachilla.

„ 6.—The pale.

Figures 7 and 8.—The lodicules.

Figure 9.—The pistil : all enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, communicated by Dr Philippi.

Poliophorus bromoides *Thwaites*.

PLATE LXIII.

PLATE LXIII.

Polypodium (*Goniophlebium*) *translucens.*

Figure 1.—A portion of the rhizome and a frond of the ordinary form.

Figures 2 and 3.—Fronds of varieties of the same, figure 3 being bipinnatifid in the lower part.

Figure 4.—Portion of a pinnule, enlarged.

Figures 5 and 6.—Sporangia, much enlarged.

Figure 1 was drawn from a specimen in the Kew Herbarium, collected by Mr Moseley in Juan Fernandez; and figures 2 to 6 from specimens collected in the same island by Mr Downton.

POLYPODIUM & MESOPHLEBIUM FRANCISCENSE *Hance*

PLATE LXIV.

PLATE LXIV.

Drifted and Stranded Fruits collected by Mr Moseley.

Figure A. 1.—Dorsal view of a carpel of *Chlænandra ovata?* from which the cellular tissue has been removed by the action of the sea: natural size.

„ 2.—Ventral view of the same.

„ B.—Fruit of *Vateria papuana:* natural size.

„ C. 3.—Seed of *Flindersia amboinensis?* natural size.

„ 4.—Fruit of the same.

„ D. 5.—Germinating seed of *Gnetum rumphianum.*

„ 6.—Another seed of the same, from which the outer envelope has been removed: natural size.

„ 7.—Cross section of the latter.

„ E. 8.—One carpel of the fruit of a species of *Brackenridgea:* enlarged.

„ 9.—The same: natural size.

„ 10.—Vertical section: enlarged.

„ 11.—Cross section: enlarged.

„ 12.—Embryo: enlarged.

DRIFTED & STRANDED FRUITS.

PLATE LXV.

PLATE LXV.

Drifted and Stranded Fruits collected by Mr Moseley.

Figure F. 1 and 2.—Different views of the fruit of *Grevillea gibbosa.*

„ 3.—Seed of the same: natural size.

„ G. 4.—Fruit of *Grevillea* sp. ? [1] natural size.

„ 5.—Vertical section of the same.

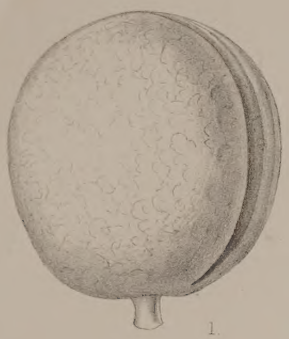
„ 6.—Seed.

„ H. 7 and 8.—Views of the acorns of a species of *Quercus:* natural size.

„ I.—Water-worn fruit of *Orania aruensis,* with germinating seed: natural size.

[1] Dr Beccari thinks this may be the fruit of a new genus of Proteaceæ, of which he collected foliage only. In the fruit sent to Dr Beccari there were two fully developed seeds.

F



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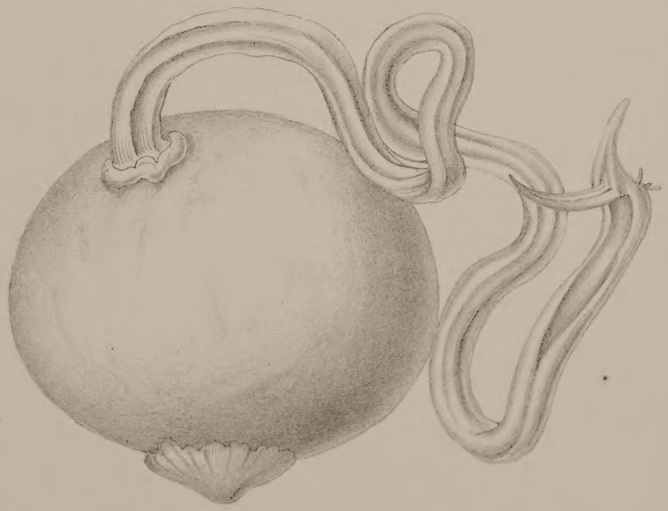

M. Smith. del. W. Gibbs lith.

McLagan & Cumming imp.

DRIFTED & STRANDED FRUITS.